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The South See P. 195

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PUBLICATION

Iron Age

NATIONAL METALWORKING WEEKLY

November 12, 1953

PAGE 2

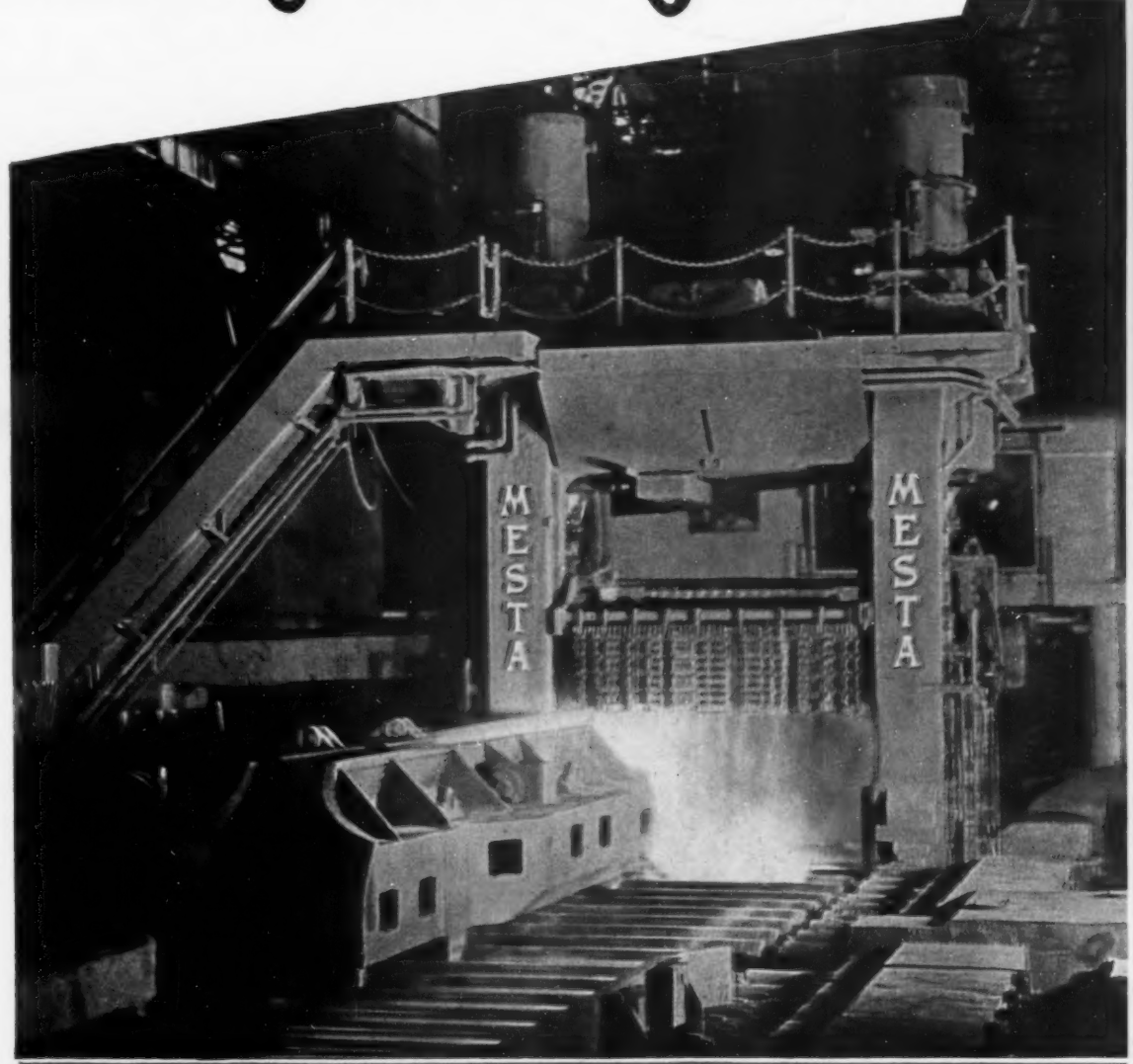
NOV 13 1953

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Modern Reversing Slabbing-Blooming Mills

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and
Built by

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MESTA 46" Reversing Slabbing-Blooming Mill
Installed at the Pittsburgh Works of the Jones and Laughlin Steel Corporation

Designers and Builders of Complete Steel Plants
MESTA MACHINE COMPANY, Pittsburgh, Pa.

Increases production 25%

NEW ROTOR TOOLS "PAID OFF" IN 13 WEEKS



JOB—Large truck cabs had to have heavy welds blended for good appearance. Men objected to heavy 14-pound grinders. Incentive shop . . . needed more production to meet schedule. Grinders required constant maintenance.

SOLUTION—Put Rotor B-12 Verticals at 6000 RPM on trial to determine their metal removing qualities.

RESULTS—Time studies show increase of 25% in production. Savings "paid off" the new tools in 13 weeks, reduced operator fatigue, cut maintenance and sanding disc costs.

Ask for a demonstration of Rotor tools and figure the savings on *your* operations! Call for a trial. Catalog 40 describing the Rotor line of production boosters is yours for the asking.

ROTOR GRINDER FACTS

B-12 Vertical 5" Cup Wheels

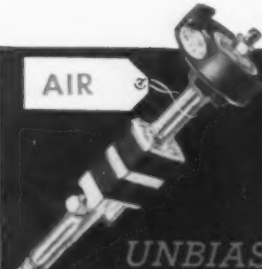
7" Sanding Pads

10 lbs.

7" Cut-Off Wheels

4500-5000-6000 R.P.M.

High speed under load—adjustable handles for comfort—built to "take it" on tough jobs.



AIR

THE **ROTOR TOOL** CO.

CLEVELAND, OHIO

UNBIASED ANALYSIS OF PORTABLE TOOL PROBLEMS



HIGH CYCLE

Standard Grades of Alloy Steel Will Often Do the Job

In many instances you can meet alloy steel requirements with standard grades. Applications, civilian or military, that really require the temperamental special grades are relatively few.

In the "special" bracket are the jobs where resistance to heat, corrosion, or low-temperature impact is the prime consideration. Here, generally speaking, you have to call upon other than standard grades. Bethlehem is usually able to supply them.

But wherever feasible, it is to your advantage to specify standard analyses—mainly for these reasons:

1. Standard grades meet the usual requirements for hardness, strength, and ductility.
2. With standard grades, chemical ranges

usually fall within closer limits than those of special grades; hence you can use the conventional, more familiar—and often less costly—methods of heat-treating.

3. You can normally buy standard-grade steels in small tonnages, keeping your inventory low. In contrast, the user who orders an other than standard grade must in most instances specify a heat lot.

Bethlehem manufactures all AISI grades and special-analysis steels, and the full range of carbon steels. Please remember that we can always furnish the grade you wish, whether standard or special. But if there's any question of choice, anything not quite clear concerning grades and their applications, by all means discuss the problem with our metallurgists. They are always at your service.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM *ALLOY* **STEELS**



The Iron Age

Vol. 172, No. 20, November 12, 1953

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Address mail to 100 E. 42 St., N. Y. 17, N. Y.

Digest of the Week in

NEWS AND MARKETS

STEEL MIRRORS NATION'S EFFICIENCY DRIVE — P. 111

As the boom settles to a lower, steadier market condition, steel is focusing attention on economy and efficiency. All manufacturing industries are trending that direction. Here's what the steel industry is doing with its operations, how it's handling the workweek. Ferret out encouraging signs.

URANIUM'S HIDDEN IN U.S.-SPAIN TREATY — P. 112

Not yet emphasized in the treaty signed with Spain last September is Article 4 giving the U. S. access to metals and minerals produced in Spain. Among them is uranium. Spain is reported to have some rich findings of this metal. While quantity's secret, it's said Spain may become big producer in 3 years.

NO LAKES IRON ORE SHIPMENT LETUP YET — P. 114

Iron ore shipments on the Great Lakes set a new annual record this week, but shippers aren't stopping operations. It looks as if ore carriers will keep running until Dec. 1 when insurance policies expire and the season officially ends. Good weather and labor peace were major factors. Shippers plan modernization.

SMALL FIRMS PROSPER IN APPLIANCE FIELD — P. 118

Even in the sprawling appliance industry you don't have to be big to be good. Cleveland's Perfect Stove Co. prospers by stressing research, adaptability, selling effort and quality. Product diversification, improvement of manufacturing techniques, an enlarged sales staff all are aids to success.

SLIGHT ECONOMY EASING UNNERVES NO ONE — P. 122

The downcurve is just perceptible, unnerves no one but more definitely the economy is trending to moderation from boom. Still at record levels, output and employment nevertheless are inching down or failing to register usual seasonal gains. Federal Reserve Board's index for October held to September rate.

STEEL MARKET SHAKEOUT VIRTUALLY OVER — P. 273

A growing number of trade sources are coming to the conclusion that the steel market shakeout is virtually completed. The scrap price barometer seems to bear out this conclusion. Bulk of inventory corrections are thought to be pretty well completed. Cold rolled sheets, structurals, plate are still tight.

ENGINEERING & PRODUCTION

SELECTIVE FLAME HARDENING IMPROVES WEAR—P. 171
Crankshafts for Chrysler engines are selectively flame hardened at the rate of 100 per hour under closely controlled conditions. Five Flamatics, automatically fed, produce hardness penetration to $\frac{1}{8}$ in. in 37 sec for a six-cylinder shaft and 48 sec for an eight-cylinder shaft. Setup is very versatile.

DRINK FITS: HOLDING POWER INCREASED — P. 175
Surface finish, radial pressures and time have been found to be important factors in the holding power of drink fits. The smoother the mating surface, the greater the holding power, this study showed. Surprising finding: Parts which originally withstood 400,000 pressure failed at much lower loads 8 months later.

RETRACTABLE BUSHINGS EXTEND DRILL LIFE—P. 178
Drilling of oil holes in crankshafts has been speeded by Studebaker through use of retractable bushings. After the first $\frac{1}{2}$ in. is drilled, bushings are withdrawn. Balance of distance is drilled in $\frac{1}{4}$ in. steps. Downtime for drill changing is lessened, and considerably longer drill life is attained.

ELECTRIC WEIGHING APPLICATIONS GROWING—P. 182
Load cells, using the strain-gage principle, measure weights from 50 to 200,000 lb in a steadily increasing number of industries. Benefits of these adaptable units are economy, speed and simplicity. Since 1949, Republic Steel has put them to use in weighing coiled strip steel, scrap, molten metal, ingots.

DEVELOP FAVORABLE STRESS PATTERNS — P. 185
Favorable surface stresses can increase fatigue life. These may be obtained by selection of proper steel grades, size and heat treatment. Tests conducted at Battelle Memorial Institute show how these stresses are produced. Water quenching steels develop compressive stresses at the surface. Part I.

NEXT WEEK—COLD EXTRUSION LINE PRODUCES SHELLS
Five cold extrusion presses form a complete line for production of 60-mm mortar shells. Estimated steel savings resulting from use of the cold extrusion method amount to 265,000 lb per month. Die design is a top factor in production by the cold extrusion method. Well-designed dies will turn out 150,000 pieces.

SALUTE TO THE SOUTH

A report on the rapid expansion of industry in the South.

WHAT CAUSED SOUTH'S EXPANSION?—P. 196

Industry had its start in the South long before that area was recognized as a fast growing market . . . Some of the little emphasized factors behind the boom.

HOW IMPORTANT IS INDUSTRY NOW?—P. 198

Industry is now pushing agriculture for the top position in the South's economy . . . Despite the many new plants that have been added, there's room for more.

RESEARCH IS SETTING THE PACE—P. 200

After neglecting it for many years, the South is now showing interest in research . . . A leading promoter of southern research is quizzed on what's happening.

SPOT CHECK ON METALWORKING—P. 202

IRON AGE study of sample group of southern metalworking plants indicates marked expansion in next 5 years . . . Almost 30 pct will bring out new products.

INDICATORS OF SOUTHERN GROWTH—P. 204

Facts and figures on key indicators of South's wealth, industrial growth . . . All signs show South is expanding faster than the nation as a whole.

SOUTH'S AUTO MARKET MUSHROOMS—P. 206

Auto industry's accurate market indexes showed South's purchasing power mounting rapidly . . . That's why Detroit built assembly plants in the South.

WHAT ABOUT SOUTH'S LABOR?—P. 208

Southern labor is proving its ability to do skilled industrial work . . . Importance of cheap labor is fading . . . Management-labor relations are improving.

SOUTHERN NEWSFRONT—P. 209

Spotlight on significant economic, industrial trends . . . Shows how important the South will be in 10 years.

SOUTHERN METALWORKING DIRECTORY—P. 210

Listing of nearly 1400 of the South's major metalworking plants . . . Addresses, what they make.

WHERE TO GET MORE INFORMATION—P. 226

Names, addresses of good sources for more information on the South . . . Listing covers 10 states.

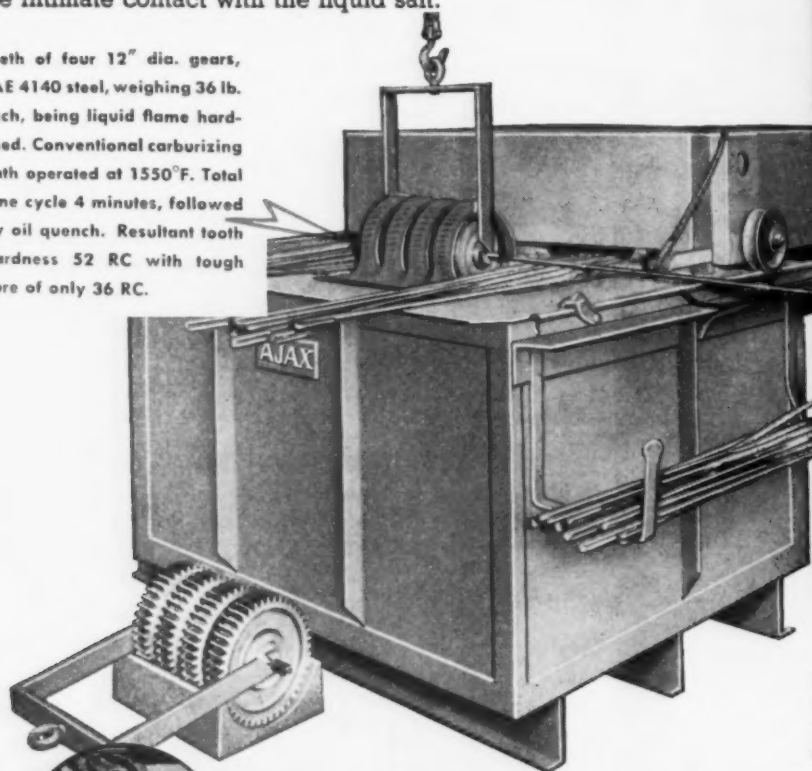
Something NEW in Selective Heat Treating . . .

LIQUID FLAME HEATING

This radically new but commercially proven application of the world renowned Ajax Salt Bath Furnace offers industry many unique advantages over any other method for selectively heating the rim or edges of circular objects, hardening teeth on gears or sprockets, and any other products that require peripheral heating.

The technique of operation is simplicity itself: Either a neutral type salt bath or a carburizing bath, heated by the internal electrode system, is maintained automatically at the required specific temperature. A number of the parts, such as gears, to be selectively heated can be mounted on a shaft within a suitable fixture which is placed over the salt bath. Only that portion of the periphery to be heated (such as the teeth) is immersed in the bath. The work is then rotated and heating is extremely rapid due to conduction by the intimate contact with the liquid salt.

Teeth of four 12" dia. gears, SAE 4140 steel, weighing 36 lb. each, being liquid flame hardened. Conventional carburizing bath operated at 1550°F. Total time cycle 4 minutes, followed by oil quench. Resultant tooth hardness 52 RC with tough core of only 36 RC.



Associate companies: Ajax Electric Furnace Corp. • Ajax Engineering Corp. • Ajax Electrothermic Corp.

AJAX electric SALT BATH furnaces

OVER 4,000 INSTALLATIONS . . . more than all other salt baths combined

AJAX ELECTRIC CO., INC., 904 FRANKFORD AVE., PHILADELPHIA 23, PA.

COMPARE THESE ADVANTAGES . . .

with those possible from gas flame or induction heating:

1 FAST AND UNIFORM HEATING

Speed of heating approximates the rate at which the work conducts heat. The hot "carry-over" layer of salt clinging to heated portion supplements heating, assures uniformity.

2 NO OVERHEATING

Since no temperature "head" is employed, overheating of the work is impossible.

3 NO OXIDATION, SCALING, OR DECARBURIZATION

The surface of work heated is protected from air throughout entire operation due to the layer of liquid salt clinging to the revolving surface.

4 FLEXIBILITY

When not used for "Liquid Flame Heating", the salt bath is available for conventional heat treating uses.

5 LESS COSTLY

Entire operation, both as to temperature and timing, is automatic using unskilled labor. Large batches of work can be treated simultaneously, effecting important economies over a piece-by-piece operation.

HERE'S PROOF

Let us treat sample batches of your work without obligation in the Ajax Metallurgical Service Laboratory. Better still, come see it done yourself! Reprint No. 73 sent on request.

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Editorial

The Iron Age

FOUNDED 1855

What's The Labor Outlook?

THIS year has seen a minimum of labor strife. This may be a lull before a storm. Labor has soft pedaled its talk until it tested which way the wind was blowing. Now it thinks it knows. Durkin's resignation was symbolic.

Organized labor has taken heart from scattered elections recently. Labor people have been keeping close tab on statements of businessmen in government service as well as their actions. Close watch on legislation has been a prime but quiet effort of the bigger unions.

Two big unions which will give management and the Administration trouble next year are the United Steelworkers of America and the United Auto Workers of America. Both are competitive even though they are the two strongest members of the CIO. The United Mine Workers have been hurt by warm weather, huge stocks of coal and oil substitutes—but John L. Lewis still packs a wallop.

Here are a few things metalworking people will face in 1954 when organized labor starts rolling out its demands:

¶ Dave McDonald, steel union chief, will be a tough man to deal with if business is good when negotiation time rolls around. A brand new steel contract has to be agreed upon. The ease with which things were settled this year was a "sleeper."

¶ Demands will be made for the usual "substantial" wage increase. If business is good a strike threat will carry weight and a stalemate can be expected.

¶ Arguments over management's right to hire and fire will be long, loud and bitter. Intertwined will be arguments over incentive systems. Both will be used as bargaining "tools."

¶ First place on the steel union's list will be a \$150 a month minimum pension—to better the \$137 the auto workers got this year. Auto workers will go after higher pay to match the steel union gains made this year.

¶ Guaranteed annual wage demand will be in the cards for several years but will get nowhere fast. It is a disguised unemployment insurance with management footing the bill.

Now is the time for management to think these prospects over and be ready for a tough session with labor in 1954. Lack of planning and thinking now will mean a lot of headaches later.

Tom Campbell

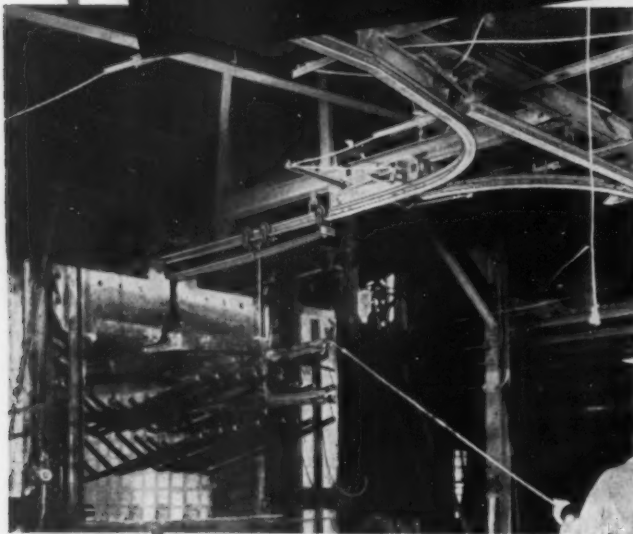
Editor

November 12, 1953

MONORAIL

eliminates rehandling

moves ware
through all processes
in porcelain
enamel plant



MonoRail over furnaces allow rapid in-out movement. Carriers made of special alloy withstand temperatures up to 1800° F.



MonoRail carries ware throughout entire plant with no rehandling from special carriers.

From start to finish, spraying to drying to firing furnaces and finally to storage one single MonoRail system provides a continual flow operation at this porcelain enamel plant. The same racks loaded at the spray booths carry the ware into and out of firing furnaces. Many of the handling operations once unavoidable are now eliminated. Savings in labor alone has fully justified the investment in this system. And true of all American MonoRail Overhead Handling Installations is the extremely low maintenance cost.

Why not let an American MonoRail engineer give you all the facts about savings and advantages?

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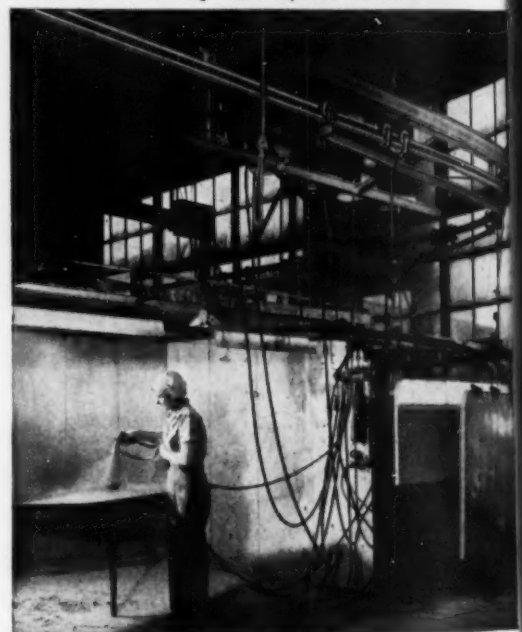
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Ground coat as well as a large variety of colors are used. Ware is hung on special MonoRail carriers after spraying.

Dear Editor:

Letters from readers

IA Bound Volumes

Sir:

It is requested that price, terms, and delivery f.o.b. Redstone Arsenal, Huntsville, Alabama be furnished on the following publications: **THE IRON AGE**, Vol. 157, 158, 159, 160, 161, 162, 163 and 164 (1946 through 1949).

It is of the utmost importance that your reply be identified by the reference number, TL-86-54.

R. E. MANLEY
Assistant
Purchasing & Contracting Div.

Ordnance Corps
Redstone Arsenal
Huntsville, Ala.

We don't have extra bound volumes but perhaps a reader can help you.—Ed.

Personnel Analysis

Sir:

I read with interest your article in the Oct. 15 issue entitled "Analysis Method Helps Management Solve Personnel Problems," and would like to learn more about this method. Can you tell me where I can contact the people who provide training in this technique?

J. J. McCORMICK
Industrial Engineer

Scars, Roebuck & Co.
Chicago

Complete information on this subject may be obtained from Mr. J. P. Cleaver, Walter V. Clarke Associates, 503 Sowams Road, Barrington, R. I.—Ed.

Dip Painting Process

Sir:

In the Oct. 8 issue, in the section titled "Newsfront," you wrote of a detearing process for dip painted parts. Please let us know where we may obtain more information on this process.

THOMAS SULLIVAN
Metallurgist

Armstrong-Blum Mfg. Co.
Chicago

Further information may be obtained by contacting the National Lock Co., Rockford, Ill.—Ed.

Water Soluble Oil

Sir:

May I ask you to give us information as soon as possible on the water soluble oil which you mention in your Oct. 22 Newsfront? We would like the name and address of the firm producing this product.

E. F. GALVIN
President

Franklin Engineering Works
Chicago

This oil is produced by the Van Straaten Chemical Co., 546 W. Washington Boulevard, Chicago 6, Ill.—Ed.

Spectrochemical Techniques

Sir:

Do you have any more tear sheets of the article: "Spectrochemical Techniques Advance Titanium Technology" featured in the Sept. 17 issue, p. 166-170?

How do you manage to maintain such a wonderful magazine week in—year in—century in—apparently forever? Just keep on shooting us the dope—we'll try to keep our mind alert till the old frame falls apart.

W. H. EVANS
Special Asst. to President
Hofmann Industries, Inc.
Sinking Spring, Pa.

Ultrasonic Vibration

Sir:

In your issue of Oct. 8, "THE IRON AGE Newsfront," you state that aluminum is prepared for soldering through use of ultrasonic vibrations in a recently tried British method. We will appreciate any information on the source of this item.

F. R. WOODWARD
Sales Engineer
The Taylor-Winfield Corp.
Warren, Ohio

The Automobile Manufacturers Association, New Center Building, Detroit 2, Mich. can give you further information on this subject.—Ed.

Flex Tester

Sir:

You will see from the above that we are motor manufacturers to the British Motors Corporation Group, and are very interested in your article of March 19, 1953, p. 143, dealing with checks on drawability of sheet steel.

We are most anxious to get further details on the Flex Tester made by Steel City Testing Machines, Inc., and would greatly appreciate your assistance in putting us in touch with this company.

J. R. VICKERS
Production Manager
Nuffield Metal Products Ltd.
Birmingham, England

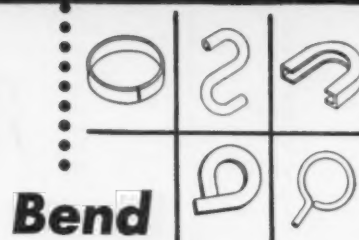
The address of the Steel City Testing Machines, Inc., is 8817 Lyndon Ave., Detroit 38, Mich.—Ed.

Trepanning Tool

Sir:

Would you be good enough to send me a copy of the article "Trepanning Tool Speeds Gear Production" which appeared in the Oct. 1 issue of your magazine?

A. J. HORVATH
Factory Representative
Kennametal, Inc.
Latrobe, Pa.

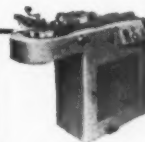


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*Pronounced Die-ack-ro



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A universal hydraulically operated bending machine that is equally as flexible as hand operated machine. Di-Acro Hydra-Power Benders are especially designed for those long runs and heavy bending operations which are impractical for manually operated equipment.



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THE BURLINGTON LIARS' CLUB SPINS A YARN FOR BAKER'S MAGDOLITE



A ROYAL FLUSH

While quail hunting down in Mississippi, a fellow lost sight of his dog, Sherlock, in the brush. And when Sherlock didn't come to whistle, he knew the dog must be on point, so he started down the path looking for him. Suddenly, across an opening ahead of him, flew two quail spaced just right—and he dropped them both. Just as he reloaded, two more came flying by—and he dropped them, too. This procedure was repeated until he had his limit. Then, walking into the brush in the direction from which the quail had come, he found Sherlock. The cagey canine had roaded a covey of quail into a hollow log. There he was, sitting beside the log with his paw over a knothole, letting the quail out a brace at a time!

When it comes to flushing a covey of quail, Sherlock certainly makes the most of the situation. And when it comes to ordering dolomite, why don't you take advantage of a good thing, too? Don't merely order dolomite. Specify BAKER'S MAGDOLITE, the original deadburned dolomite.

BAKER'S MAGDOLITE is a dolomite of superior chemical, physical, and mineralogical composition. It's properly burned grain-size particles assure more uniform ingots, lower fuel costs, and less defective production material.

Next time, order BAKER'S magdolite! It's always 5 ways better: Composition, Preparation, Strength, Economy, and Quality.



PRODUCTS
SINCE 1889

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MAGDOLITE

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THE J. E. BAKER COMPANY

YORK, PENNSYLVANIA

Plants: York, Billmeyer, Pennsylvania—Millersville, Ohio

Fatigue Cracks

by William M. Coffey

Hurstmon, Who?

Here's a friend in England, Mr. L. H. Day, Esq., who has found where the body is buried. Seems while perusing the *Birmingham Mail*, he ran across an item about THE IRON AGE, your favorite family journal (ffj). But let him tell it in his pure Churchillian prose. He writes thusly . . .

"These many years, fellas, I have liked to think that when our ffj retires its scribes they either fade gently into some palmy background in Southern Cal., or buy themselves a bungalow up White Plains way, or maybe even stake themselves an acre or two in the greener parts of Long Island, and then, like old soldiers simply fade away.

Apparently it ain't so. The ffj, it says here, parks its used-up bodies in the grounds of an English castle, than which you couldn't get farther from East 42nd, not if you tried for a million years.

USED IN IRON AGE?

The remains of what is believed to be an IRON AGE burial ground have been discovered in the grounds of Hurstmonceux Castle (Sussex), the home of the Royal Observatory.

Tell me, fellas—how come? Is this something to do with DMEA, or ECA, or maybe even ODM? Or is it just our ffj parking the corpses of those staffwriters who persist in plugging for cheesecake in its unsullied columns?

If you're really stuck for corpse-lots, fellas, we can rent you some first-rate morgues. We've got lots of government offices, for instance, where a couple dozen extra stiff wouldn't even be noticed. But please, fellas, lay off the Stately homes of England. OK?"

Hurstmonceux, of all places.

In the same *Birmingham Mail* we also saw this item:

LONG SERVICE TO LIFEBOAT CAUSE

The Royal National Lifeboat Institute has appointed Mrs. Elsie Thornewill of Copethorne, Sussex, an honorary life governor in recognition of services to the Central London Branch of the Ladies Lifeboat Guild for many years.

Re: Percy (Ibid)

Airlines have their share of troubles. A Pan American clipper recently transported a kiwi bird, Percy by name, from Auckland to London. Here are excerpts from the instructions they received concerning transporting said Percy.

"... please endeavor to supply large worms, as the kiwi is a rather lazy feeder and takes only a limited number of pecks per meal, regardless of the size of the peck . . . we understand that arrangements have been made in Honolulu for the bird to run around on a grassy patch . . . the bird will be packed in a crate with a sliding lid. All persons handling this bird are warned that it may possibly attempt to jump out of the box when the lid is opened, and while it cannot fly, it can run very fast. . . ."

Puzzlers

Some additional winners of the horses, cows and pigs problem: Margaret E. Sutton, Floyd Randall, John T. Drummer, Arnold Chase, Paul Richardson, William Purtell and M. J. Ollis.

Now for the fibbets, the paladines, the braps and the smoons (Oct. 22 puzzler). Answer:

Brown—Smoon—84¢
Jones—Flibbet—72¢
White—Brap—12¢
Smith—Paladine—9¢

Stepping to the head of the class are: Milo M. Bowman, Dan Babcock, Milton C. Kester, Paul A. Tackett, Arthur C. Willis, Wade Greer, Gustaf A. Alsterlund, O. L. Hurtt, D. E. Waris, Austin C. Brown, Jack Coppersmith, Paul H. Brauer, Robert L. Leslie, Harry Lucas, Milo Hopkins, George Hooper (and his wife), John L. Hawes, R. H. Kimber and T. O. Jones. Many sent in another solution. We're holding all double answers on file until we can check the old professor of Math 2A at Ivy Hall.

New Puzzler

If Eustace works 4 days and Angus works 10 days (together) to complete one job that Eustace can do in 3 days less than Angus, each working alone, how long would it take Eustace to do the job, working alone? Many thanks to Mr. Paul Tackett of International Harvester for this one. (And you're right about the father and son.)

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THE IRON AGE Newsfront

NEWSFRONT

NEWSFRONT

NEWSFRONT

NEWSFRONT

APPLICATION OF ULTRASONICS TO HEAT TREATING is being explored. Experiments indicate steel ultrasonically bombarded during nitriding may have a case many times thicker than steel.

RENEGOTIATION BOARD ECONOMISTS are investigating steel conversion charges during the Korean War period. Aim: To determine whether some converters might have made too much profit on conversion work done on orders for defense steel.

A BIG IMPROVEMENT IN POWER BRAKES will be added in some 1954 automotive lines. An electric-powered vacuum pump will be incorporated in the system to supply power for brakes when the engine fails. In older systems, when the engine stops, no power to the brakes is generated, forcing the driver to supply all the braking force.

AS ORE STOCKPILES CONTINUE TO GROW, Great Lakes shippers have lowered estimates for this year's all-water tonnage. Fleet haul may run from 93 to 96 million tons, just shy of the 100 million ton goal. At least 50 boats are now up for winter repairs.

ORGANIZED LABOR MAPS PLANS for intensive political campaigning next year to elect "liberal" candidates to Congress. AFL president George Meany is instructing lieutenants to "start early" in setting up fund raising organizations which will aid prolabor candidates.

MORE RELIANCE IN PHYSICAL TESTING of parts rather than examination on the microscope to determine best heat treatment is a trend in the auto industry. Further use of road testing, development of new testing apparatus has helped accelerate the trend.

TITANIUM SHOULD BE WORKED LIKE MAGNESIUM, not like steel, one firm studying stamping, deep-drawing of Ti claims. Work so far is limited to commercially pure metal but the company is optimistic on alloys.

THERE'S A CHANCE Labor Secretary James P. Mitchell will let ride the \$1 an hour minimum wage proposal former Secretary Martin Durkin sent to the Budget Bureau. Mr. Mitchell will "review" the recommendation but he is on record as favoring principles of the minimum wage law.

A PORTABLE ELECTRONIC DEVICE which inspects steel rail soundness by supersonic means is now in use by a major railroad. The device supplies a steady, high-pitched tone to a set of earphones. This tone drops to a growl when the detector passes over an imperfection.

USE OF ELECTROSTATIC SPRAY PAINTING equipment is getting more attention from large automakers. Following the lead of Studebaker, a body maker for one of the Big 3 is reported to have signed a contract for installation of the equipment. Another big auto firm is reported enthusiastic about possible paint savings.

OXYGEN STEELMAKING, well established in Europe, is receiving greater recognition this side of the Atlantic. The first Canadian installation by Dominion Oxygen Co., Ltd., should be ready in the spring of '54. An American firm is slated to start operation in about a year.



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STEEL: Mirrors Nation's Efficiency Drive

Focus on economy, efficiency . . . All manufacturing moves in that direction . . . What steel is doing with operations, workweek . . . Ferret out encouraging signs—By J. B. Delaney.

The steel industry is taking on the lean, well-conditioned look of a fighter who is going into intensive training after a lush period of knocking over pushovers. And what the steel industry is doing is part of the mass movement of manufacturers in general to cut costs and increase efficiency.

Much of industry's boom fat has been sweated off. Declining new order rates and thinning order backlogs supplemented by widespread recession talk saw to that.

That was merely the prelude. With the rest, the steel industry is highlighting the economy and efficiency trend by streamlining operations, shutting down marginal facilities, trimming workforces and workweek, paring inventory, talking tough on prices of raw materials.

Layoff News Belated

Because labor ranks at the top as one of industry's highest fixed costs, you can be certain that emphasis on pruning payrolls and the workweek will mount. Later in this article you will see from trend of the manufacturing workweek that industry has been quick to adjust to the dictates and prospects of demand. Yet because the tenor of the economy will remain at a strong pitch in 1954, no precipitous hike in unemployment is anticipated.

Recent headline-grabbing steel industry layoffs are only part of the picture, and a belated one at that. They were preceded by cutbacks in the workweek and reduction of overtime pay. Marginal facilities are being shut down as

quickly as the mills can do without them.

Actual layoffs by the industry are negligible, add up to something like 10,000 workers, about 1.5 pct of the total working force of approximately 700,000.

Some of these men are now being rehired as products affected begin to show renewed strength.

The declining ingot rate is giving the industry its first real opportunity to test the worth of its multi-billion dollar expansion and modernization program under reasonably competitive conditions. Steel men are optimistic. E. J. Hanley, president of Allegheny Ludlum Steel Corp., said recently

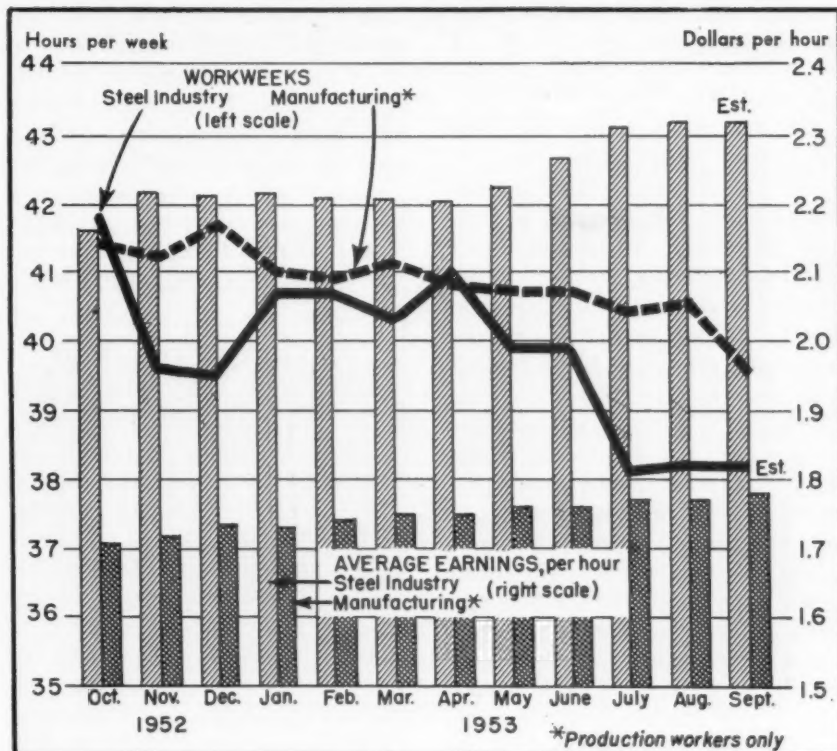
his company can make money even at an operating rate of 65 pct. He could not have said this several years ago before the firm's installation of more efficient mills and machinery.

Motive for Cutbacks

Changing conditions in steel mirror what is happening in industry throughout the country. This is apparent in reasons behind order cancellations and cutbacks by steel consumers. Most of this was due to inventory correction. With steel supply catching up with demand, consumers viewed heavy inventories as a costly luxury and acted accordingly.

Steel executives are finding this out first hand as they make the rounds of their customers in an effort to learn what lies ahead. What many of them are finding

Trends of Production Workers' Hours, Earnings



URANIUM: Hidden in U. S.-Spain Treaty

One part of agreement gives U. S. access to Spain's minerals, metals . . . Uranium ore included . . . Fields are believed to be rich . . . What U. S. will give Spain.

Not yet emphasized in the treaty signed with Spain last September is Article 4 of the agreement which gives the U. S. access to metals and minerals produced in Spain. Among them is uranium.

Basically the treaty provides for establishment of American bases on the strategic Iberian Peninsula in exchange for economic and military aid. But the treaty also makes possible considerable purchases of Spanish minerals and metals by the U. S.

Contacted by THE IRON AGE, the State Dept. said that as yet no conference has been held between the two countries to determine

either what or how much the U. S. will buy.

But IRON AGE's correspondent in Spain has learned from well-informed sources approximately what minerals and metals the U. S. may get. Most interesting item on the list is uranium ore.

Censor Uranium Information

Spain is reported to have very rich ore findings, but all information on these resources has been censored since 1945, and under government control, uranium mining has been prohibited. But it is known that uranium ore was a major consideration during the 20

months of negotiations between the U. S. and Spain.

Uranium ore findings in Spain were first described by a University of Chicago professor in 1910. Of the 20 known deposits, most are considered to be very rich. Among the important fields is one near Cordoba which covers an area of about 60 sq miles. Uranium content from these fields is believed to be about 4 kilograms per ton of permatite.

A Security Secret

It is believed that the U. S. will have access to all of Spain's uranium resources. The amount involved cannot be released because of security reasons. However, informed sources say that within 3 years Spain will be able to turn out large amounts of uranium.

And this source of supply may eventually considerably supple-

Special Report

Continued

is encouraging. Their customers' order books may have slimmed down but are still good. As long as they stay that way even the hardest-hit mills look for better business when inventory correction is completed.

Protect Steel Profits

Meanwhile, producers are viewing leaner order books with a great deal of calm. They consider today's ingot rate something they could be happy with forever. Even a below-90 rate, a possibility late this year or early next, holds no terror. They view the earnings outlook as good, intend to protect their profits.

Despite reduced operations, steel prices are holding firm. Only casualties so far are the premium-price mills which have been forced to meet competition as consumers balked. Steel wages will hold steady at least until next summer when industry contracts with the United Steelworkers are reopened.

Freight absorption will likely have a negligible effect on earnings as long as it is being done

on a selective basis as is the case today.

American Iron & Steel Institute figures show a leveling off in the average workweek of steel production employees through August at about 38.2 hours. On the basis of ingot rates for September, there is likely to be little change from this figure. October may show a decline, however. Average for the year through August was an even 40 hours. Average in each of the first four months of the year was above 40 hours, with April registering 41.

All Manufacturing Drops

Total employment in the industry reached a peak of 696,000 in July. This dropped slightly during August to 695,600. August was the year's record month for overtime pay to production workers, totaling approximately 7.4 million hours, an increase of over 1 million hours from July.

U. S. Dept. of Labor statistics show that during the past year the average workweek in all manufacturing industries has dropped

off fairly steadily. High point for the 12-month period from September, 1952, to September of this year was reached last December, when the workweek was rated at 41.7 hours.

Since then, with the exception of slight increases in February and August, the workweek has either dropped or done no better than hold its own in every successive month.

Others Show Like Trend

Latest figures available show that workweek in August was 40.5 hours and this tailed off to 39.6 hours in mid-September, the lowest month of the year.

Similar trend was apparent in workweek in durable goods industries. Maximum number of hours worked in the same 12-month period for this group was 42.5 hours in December, 1952. The average continued to drop with the exception of slight increase in March. According to latest figures available, the workweek in durable goods industries has eased to 40.5 hours.

ment output from mines in the Congo.

In addition to uranium it is expected that the U. S. will buy 1.7 million tons of Spanish pyrites and 6 million tons of iron ore during the next 3 years.

The U. S. may get purchase rights to 50 pct of Spain's tungsten output, 70 pct of its vanadium and tantalum production, 30 pct of its limited molybdenum production. It is reported the U. S. will buy 70,000 flasks of quicksilver and purchase some lead and zinc.

American economic aid will consist of shipments of finished products, production equipment and armament. Excluding expenditures for armament, orders for goods to be shipped to Spain during the next 3 years are expected to be worth between \$700 million and \$800 million.

Expand Mining, Steelmaking

In the next few years, Spain may get \$67 million worth of American-made locomotives, mostly diesel-electric units, box cars, rails and other railroad equipment. This includes parts to be used in Spanish factories producing railroad equipment.

U. S. may also ship road-building machinery, tractors and other similar machines worth \$58 million.

Spain is extremely interested in developing its mining industry and may get \$71 million worth of mining machinery from the U. S. American aid will also be used to modernize Spain's steelmaking facilities. Value of the steelmaking equipment Spain may receive is approximately \$108 million.

Won't Raise Arms Output

Spain's arms production, however, will not be increased as a result of the treaty. Feeling is that Spain, whose entire annual budget is less than the amount needed to run New York City, cannot afford to support a highly mechanized army.

Instead of building up arms production, Spain will get repairs and supplies from U. S. plants in Spain. Cost of these items is a defense secret.

It is believed that at present Spain would be able to mobilize 48 army divisions within 2 weeks. The men are well trained, but most of their equipment is regarded as obsolete.



SOFTENING and descaling line at Sheffield stainless rolling mill.

English Stainless Mill Rolls

Helping overcome Britain's shortage of stainless steel is the new 20,000-ton-per-year stainless rolling mill at Sheffield. It's said to be the first wide sheet stainless mill in England, rolling sheets up to 1 meter (39.37 in.) wide.

Jointly owned by Firth-Vickers Stainless Steel Co. and Samuel Fox Co., the mill was conceived during the war when both firms were planning post-war expansion. So they joined up.



WOODEN floors, back porch are only parts not made of steel or slag.

FIRST Austrian use of steel profiles for door posts in home construction is shown. Rubber gaskets form seal.

Slag, Steel House Is Termite-Proof

Following the lead of meat packers who use "everything but the pig's squeal," the United Austrian Iron & Steel Works has built a house almost entirely of its own products and byproducts.

From the cemented blast furnace slag foundation to the stamped

sheet steel shingles, the only exceptions are glass and cement.

Trapped air in the cement-bonded slag walls provides warmth and dryness by its excellent insulating properties. Bricks molded from slag mixed with cement form the basement floor.

Backbone of the house is steel, with profiled sheet steel for beams and girders. Door frames, window frames and doors are stamped from steel. These, as well as the stamped steel shingles, are given a rust-resistant treatment.

Designed for a family of five, the model house is the first of 300 planned for erection in the next 5 months. An export campaign will be aimed at areas where insects destroy wooden buildings.

Complete with plumbing and a lot the cost is \$3865.



ORE: Shippers Don't Stop at Records

Previous Lakes peak erased this week . . . But boats expected to run until Dec. 1 . . . See 96 million ton total . . . Weather, labor helped . . . Plan modernization—By R. M. Lorz.

Statisticians in the Great Lakes area sharpened pencils and dug through record books again this week as the ore fleet steamed through the season's first snow flurries with a record payload.

Existing record for annual tonnage was erased officially last Monday when the season total climbed to 92,720,346 gross tons. The record, 92,076,781 tons, had stood for 11 years, a reminder of hectic World War II days when an arsenal was being built.

Won't Stop Yet

Shippers eyeing an even greater total promised the movement wasn't over yet. Weather permitting, the fleet still has 2 weeks to operate. Early closing dates suggested a few months ago have had to be revised. Larger vessel operators now say carriers will be plying northern routes until insurance coverage expires and the season officially closes Dec. 1. At press time about 200 boats were still in service.

Winter clamped down on shipments for the first time last week but didn't stop speculation about that magic final tonnage figure. Fresh water experts informally

set a goal of 100 million tons when the season began last April. It has been revised only because storage docks are piled high.

Larger mills already have more than enough ore. Smaller independents just haven't got room for more. Estimates on the official total for the year now range between 93 and 96 million gross tons. Majority of ore shippers seem to be leaning toward the latter figure.

All kinds of records have been set since the first ice jams were broken up last spring. Carriers hauled record tonnages in July and August: *The Joseph H. Thompson* loaded seven cargoes in October, at least three more than a "good" performance of one load per week. The largest single cargo of ore was locked through earlier in the spring.

The record breaking showed up in stockpiles. By Oct. 1 storage bins bulged with an estimated 51 million tons compared to the 41 million tons stored during a similar period last year.

It has been a remarkable performance. It wouldn't have been possible without good weather, a more modern fleet and unruffled

labor conditions. With the exception of a few mid-April ice jams traffic has been smooth. Boats got off to a fast start and temperatures were so moderate up to Nov. 1 that time-consuming ore steaming wasn't necessary.

Statistics emphasize the importance of labor harmony better than words. The disastrous 8-week strike last year forced a loss of at least 22 million tons. By Nov. 2, 1952, all water shipments of ore totaled only 65,762,378 gross tons. On the same date this year 90,941,859 tons had been moved.

Now that the records are in the bag shippers don't intend to rest on their laurels. Prospect of reduced steel operations and possibility of returning to an 80-million-ton annual level has most operators talking of more efficiency.

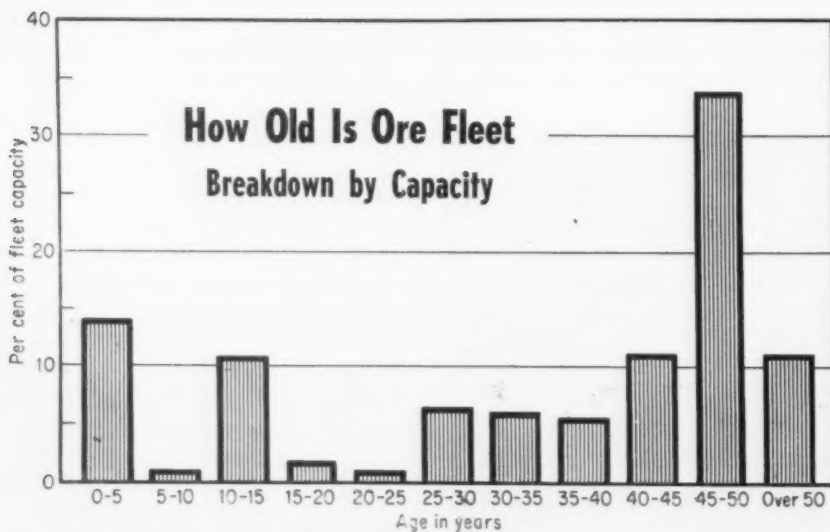
Launch New Carriers

Efficiency on the Lakes means boats—newer and faster ones. In addition to completing routine winter repairs shippers plan to tackle at least eight repowering jobs. These entail everything from installation of new boilers and turbines to complete electrification.

At the moment new construction for '54 hasn't gone beyond the talking stage. On the American side of the Lakes National Steel Corp. plans to launch a new carrier sometime in 1955. At least one self-unloader should increase capacity in 1954.

Canadian shippers have a slightly more ambitious program nearing completion. They will add at least four 20,000-ton giants to their fleet in addition to two converted oil tankers.

South of the Canadian border concern about obsolescence is growing. Many operators believe efficient operation will stand or fall on a program of modernization. There are at least six ore carriers in the 50-year-old class which make the subject more than academic. If shippers are to deliver 80 million tons annually the granddaddies of the fleet will have to be replaced or spruced up.





SKULL SESSION for Horton's management team. Left to right, George S. Chiaramonte, Horton Chuck Div. sales manager; Douglas H. Thomson, vice-president and secretary; Edward M. Baldwin, Jr., executive assistant; Robert S. Cooper, president; Theodore Wilson, factory manager; George B. Cole, Gabb Special Products Div. sales manager; and Philip T. Sherman, Treasurer.

OLD AGE: How to Keep Plants Young

Years can ravage businesses as well as people . . . But industrial rejuvenation is easier . . . Comprehensive effort needed . . . How 102-year-old Horton Co. did it—By G. G. Carr.

Corporation arteries can harden too. But industrial geriatrics is a lot less complicated than its medical counterpart. —All it takes to rejuvenate an elderly business is brains, sweat, teamwork and a lot of guts. Of course these qualities are not exactly glutting the market, but when they are located and compounded, the reaction is worth watching.

Eli Horton was concerned with industry's adolescence when he invented his lathe chuck in 1851. His model was a significant step towards the machine tool industry's maturity. Ironically, the company he founded today provides a good case history in the treatment of industrial senility.

The E. Horton & Son Co. has been a landmark on the bank of the canal in Windsor Locks, Conn., for 102 years. Its precision lathe chucks carried the firm name all over the world. By the end of World War I Horton was preeminent in its field.

But the twenties and thirties blighted a good share of New England's industry. Horton didn't escape unscathed. When a new, young management group took over

the firm in 1948, it was obvious that postwar competition meant complete modernization on all fronts.

It wasn't going to be easy. The shops still used belt-driven machines installed to meet World War I defense business. Power for the overhead shafts came from water wheels driven by water from the canal. Mechanized materials handling equipment was conspicuous by its absence.

Buildings and maintenance equipment were rundown, needed drastic up-dating. Working conditions were bluntly below par by today's standards. Wage scales, personnel practices and employee relations all needed overhaul. Sales and customer relations were the lowest in the company's history.

To top it off, Horton was wobbly financially, didn't have the money to pay for these changes. It was obvious that if the new management was going to cross any goal lines they would have to run their own interference.

Carefully prepared briefs convinced Reconstruction Finance Corp. and General Services Administration that the firm deserved assis-

tance. Through these agencies Horton secured about \$500,000 of new high-speed production machines.

Valuable equipment must be properly housed. For Horton this meant complete renovation of the Windsor Locks plant. Company executives rolled up their sleeves themselves. It was not unusual to see them moving machinery, sorting out junk piles, laying amesite for outside storage areas or using a paint spray gun.

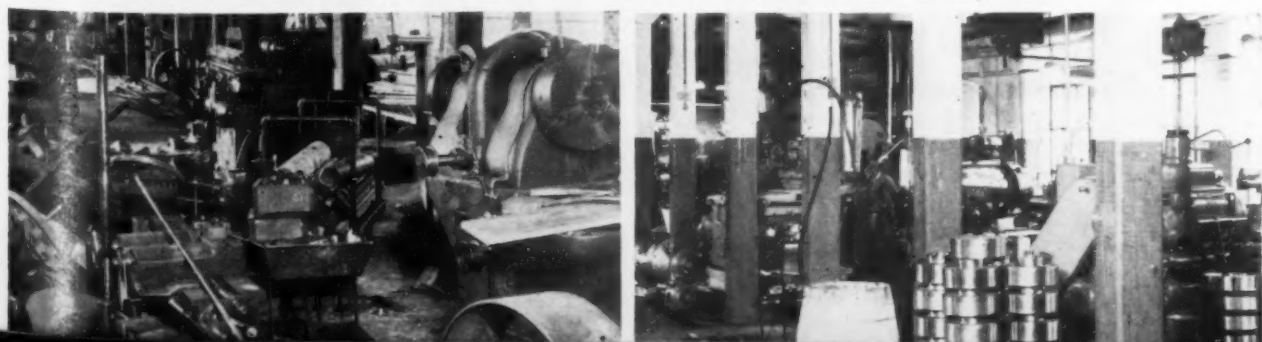
Diversify for Stability

Since the chuck business more or less follows the boom-or-bust machine tool business, Horton management was anxious to diversify the product mix for stability. In 1949 the company merged with Gabb Manufacturing Co., then in East Hartford. The E. Horton & Son Co. became the parent company of two divisions: Horton Chuck and Gabb Special Products.

Gabb is well known as a manufacturer of aircraft products and construction equipment. Major aircraft items include piston position indicators, fuel filler caps for pressurized jet fuel tanks, various ground maintenance tools. Motoroller, a power roller for paving driveways and sidewalks, is probably its best-known product in the construction and equipment field.

To make sure the firm stays on top of the market, Horton is building a strong engineering and development department. Typical of the progress in engineering is the 12-jaw, pinch type chuck (46 in. diam) which Horton pioneered for the machining of large stress-relieved

BEFORE AND AFTER scenes show transformation of Horton Co. machine shop.



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Management

shrouds and rings in jet engines. The jet fuel filler caps were also developed by the engineering staff.

New sales representatives and distributors are added frequently to meet competition, bring in new business. The first sales conference in 102 years was held last August, was considered a resounding success by company officials. Indicative of the sales effort's intensity was the recent purchase of a company plane to rush engineering and production men to selling fronts.

Skilled labor is hard to find in the Hartford area, particularly for smaller firms. Horton reports very satisfactory results from its three-pronged attack on the problem. First step was to improve physical working conditions. This has been a continuing major element in planning renovation decisions.

People Not Skills

Second was a complete overhaul of wage structure, benefits, personnel policy. Wage policy was brought into line with area practices, benefits increased, and an employee relations program instituted. A special feature was installation of the Scanlan Incentive Plan this summer. Company spokesmen are outspoken in their praise for this system.

In recruiting new workers, the company emphasizes high-type people rather than high skills. It reports very good success with a program of on-the-job training by older workers of unskilled and semi-skilled employees who want to learn.

Current sales figures are not yet available, but Horton says they far exceed past records set in peak periods in World War II. The job isn't finished, of course. Competition is omnipresent. A bad recession could hurt a small company badly. Financing could present a major obstacle. And eventually major plant construction will be necessary.

But Horton executives are optimistic, feel sure they can cope as future problems arise. In the meantime they're too busy for any extended crystal-balling. And they stress they have a secret asset: the loyalty of their customers who stuck by them during the difficult modernization period of the past few years.

LP GAS: More Products Burn New Fuel

Propane, butane losing momentum of postwar boom . . . Main markets are home and farm . . . Transportation use boosted . . . Pipeline transport would help—By K. W. Bennett.

Liquefied petroleum gas, a relative newcomer to the fuel field, is exerting a growing influence on manufacturers of home appliances, farm and transportation equipment. Lines of this equipment have sprouted to accommodate the new fuel and can be expected to broaden as use of propane and butane increases.

The expanding use of propane and butane as a power source continues. But the head-over-heels expansion of the postwar years is slowing. In the period 1945 through 1951 LP gas expanded by an average 23.5 pct. In 1952 the percentage increase dropped to 6.7 pct. Despite 50,000,000 gal of new storage scheduled for 1953, there were indications last week that the 1953 increase in propane-butane consumption will about equal the 1952 figure.

Other Markets Opening

The men who market propane and butane point out that their primary market still is to the home. Appliances for cooking, water heating, and space heating, in that order, still appear to be the number one outlets for LP gas and a market that will receive considerable attention.

The farm home remains a strong potential for LP-gas burning appliances. The home is expected to remain, as it is now, the primary outlet for butane and propane equipment. But other market areas are becoming increasingly important.

One good and continuing bet is the farm tractor. At least six manufacturers have put butane-propane propelled tractors on the market in recent years. In 1952 the number of these tractors employed on farms rose 22 pct, and the number of units in service reached an unprecedented 130,000.

At the same time, the LP pro-

ducer is shooting for an LP-gas powered farm. He can offer furnaces, clothes driers and other appliances, brooders, stock tank heaters, weeding machines, harvesters, cotton-pickers, and tractors that are butane or propane powered. Last year the domestic and motor fuel market consumed 2,683,000,000 gal of the total 4,110,000,000 gal of liquefied petroleum gas sold.

Increased bus, truck, and power plant consumption is giving butane-propane another boost in the heating-motor fuel category

Use of LP Gas (Thousands of Gal)

1945	1,067,979
1946	1,410,370
1947	2,008,262
1948	2,511,160
1949	2,658,749
1950	3,254,082
1951	3,852,411
1952	4,110,000

Number of trucks, buses, and stationary engines burning propane-butane rose by 30 pct in 1952 and reached 50,000 units. Applications included irrigation pumping, city taxicabs, city buses, mining equipment, heavy construction equipment, and lift trucks.

Engine Wear Low

Although propane buses haven't caught on in the East strongly, a number of municipalities in the Midwest and Southwest have been increasing their fleets of LP burning units. Wichita, Chicago, and San Antonio have produced studies indicating increased engine life, lower operating cost, and fairly low air pollution through use of propane powered city buses.

At least two of these cities estimate 400,000 to 500,000-mile runs with their propane burning bus en-

gines before any extensive engine repair work would be necessary. One, reporting on an engine that had completed 230,000 miles, indicated a cylinder wall wear of 0.005 in.; camshaft wear of less than 0.001 in.; valve stems and valve faces no measurable wear; crankshaft connecting rod journals 0.001 in.

Try Out Locomotive

Enthusiasm of city officials in these areas indicates a continuing market for propane powered equipment. The bus field was relatively unplumbed before 1949, and it wasn't until 1951 that any number of propane powered buses were operating.

Industrial use of propane and butane remains relatively low. Industrial consumption accounted for 281,692,000 gal in 1951, a peak year, and 266,000,000 gal in 1952. Besides industrial furnace use, LP gas has been used as a controlled atmosphere to some extent in carburizing operations.

With engine fuel and home use the best proven markets for butane and propane gas to date, LP men are watching the first reports on an LP-burning gas turbine now used on a locomotive in the Southwest and hoping for the best. Preliminary returns sound good, but this is developmental work at best.

Where It's Derived

Butane - propane is obtainable from three sources. From a natural gasoline cracking plant, from natural gas, and from crude oil cracking. Because it is delivered under pressure, however, most transportation has been by tank car, though a few pipe lines are available to carry "slugs" for LP gas. Cheaper transportation costs available through pipe line transport of large quantities of liquefied petroleum gas might encourage use in the Northeast. Transport companies indicate propane can be used to best advantage when the fuel saving runs to about 5¢ per gal.

Though expanding use is at a lower rate, liquefied petroleum gas is picking up momentum in the transportation field.

APPLIANCES: Size No Sales Necessity

Perfection Stove prospers in competition with giant firms . . . Stress research, flexibility, selling, quality . . . Drive for exports . . . Defense work helps—By R. M. Lorz.

You don't have to be big to be good. Many relatively small firms prove the adage daily by quietly holding their own in competition with industrial giants.

The economies inherent in mass production would seem to be a must in the sprawling, fiercely competitive appliance industry. By this logic, large companies should be the order of the day in the industry. In practice, smaller companies not only exist but flourish.

Research Costs, Pays

The red triangle of Cleveland's Perfection Stove Co. has been familiar to the trade for over 60 years. In that time Perfection has prospered, grown from a small 30-man foundry to a 2400-man operation.

Executives list four prime movers in the firm's growth: Research, adaptability, salesmanship and quality.

Product research has been a

fetish with Perfection ever since it marketed its first stove. Company officials admit that the early small tin stoves with nickel plated legs and mica windows were little more than glorified oil lamps. Today a 6-story research center constantly seeks out better methods, products.

Research has led to modernization programs costing an estimated \$1 million. And Perfection people consider every dollar well spent. Since the research center was opened just after World War II the company has introduced an impressive array of products. These range from new gas and electric ranges to military engine heating equipment guaranteed to operate in arctic temperatures of — 65 F.

Flexibility Is Defense Need

Two sub-zero laboratories in the research center prove out products before shipment. Both civilian and

military products are tested in the cold labs, one of which can comfortably house two Greyhound buses.

These labs date back to pre-World War II, reflect Perfection's concern with defense contracts. The company says it will be ready to serve as long as there is a defense program, backs up its statement by pointing to its record in three wars.

To be ready for such emergencies a firm has to be flexible. It wasn't until a few years ago that Perfection had a chance to show just how adaptable a small plant can be. Early in 1951 the firm agreed to build jet engine components on subcontract, even though its plant had historically limited itself to press work.

Won't Neglect Civilians

Within a few weeks, required materials were on order. In 12 months Perfection workers moved about \$10 million worth of machine tools into their plant. Although only a handful of supervisors were even vaguely familiar with machine tool work, they quickly switched to plant operations involving precision machine tool work.

And while all this was going on, Perfection's traditional line of civilian goods was coming off the line in a business-as-usual manner.

Today talk of recession and adjustment floats through the land. But Perfection won't neglect the civilian market. At least 50 pct of the firm's research efforts are devoted to ways of turning out better gas, electric and kerosene ranges, gas and oil space heaters and furnaces, water heaters and room air conditioners.

Expand to Sell

Serving this consumer market will take some selling. Vice-President I. H. Rasmussen is confident his sales staff will deliver. Perfection has trebled its sales staff since 1945, has never feared the age of the hard sell. This policy has paid off. Appliance sales are rising, outlook for the imme-



ELECTRIC RANGE gets last minute check at Perfection's Cleveland plant.

Machining

iate future is bright. Independent distributorships and jobbing arrangements are on the increase. Trade with South American and European countries in addition to Canada is also on the rise. Export business accounted for 10 pct of Perfection's total appliance sales in 1952.

In combing the foreign market Perfection is frankly aiming at national distributorships. Export Director D. W. Milestone has a reason:

"We feel that by dealing directly with the countries concerned and with nationals of these countries we are dealing with persons who have the best knowledge of local needs, the people, customs and the local market."

The Cleveland firm is also thinking of future market development when officials say they might launch a program of supplying technical help, parts and vital materials to countries who want to manufacture and assemble appliances at home.

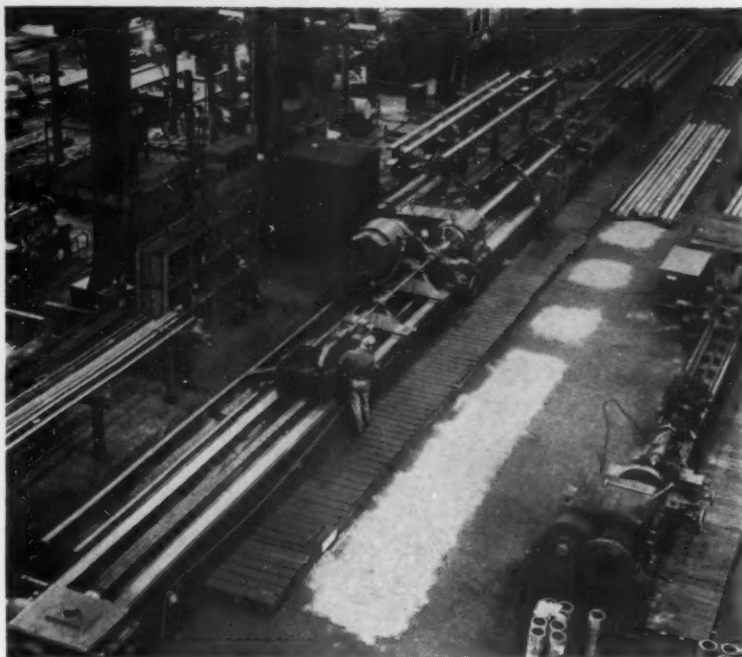
Quality at Perfection is taken for granted. Perfection is one of the few appliance firms which still makes its own porcelain enamel. It must be quality stuff because other firms subcontract some of their own parts for coating.

The enamel, general quality, competitive pricing, research—all of these have produced something concrete: An estimated increase in annual sales from below \$10 million in the 1920s to over \$30 million in 1952. That's the most tangible proof that there is still plenty of room for small business with knowhow.

Ban Union for Part-time Guards

Part-time plant guards cannot join unions of other employees, National Labor Relations Board has ruled. The unanimous ruling upsets a previous NLRB order which authorized plant guards to join unions made up of other plant employees if they worked less than half of their time as guards.

Under the new ruling, part-time guards may join unions of other guards, but not of workers.



TWO OPERATORS are dwarfed by the 146½-ft double end boring lathe.

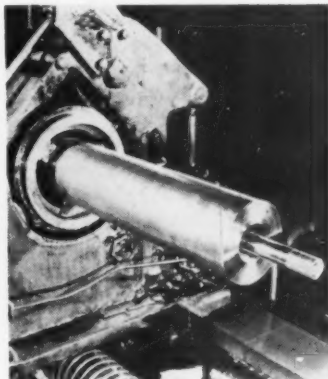
Bore Piece from Both Ends

Burning the candle at both ends isn't a good idea—but trepanning from both ends of a steel bar bores out oil field drill collars ten times as fast as earlier methods. That's what Spang-Chalfant Div. of National Supply Co. claims for its new double-end boring lathe at Ambridge, Pa.

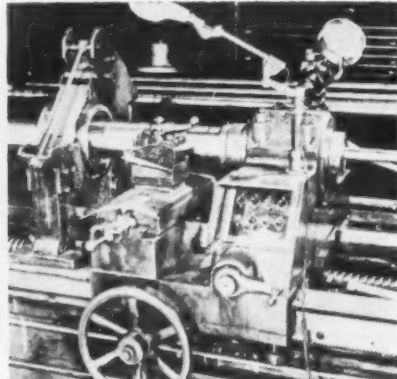
Drill collars, which give greater weight to the bit in oil or gas well drilling operations, up to 55 ft long with 8-in. maximum diameters can be bored on the 146½-ft long machine. Inside diameters generally range from 2¼ to 3½ in. and usual length is 30 ft.

Trepanning heads bearing ¾-in. carbide-tipped cutting tools are fed simultaneously into the ends of the workpiece on hollow boring bars. Penetration speed varies slightly from start to finish as the tool dulls. Either of the two operators can start or stop the lathe. Each controls the feed of his end.

Yet another advantage is that the solid core "scrap" can be used by machine shops needing small diameter bar stock.



CORE piece protrudes from end of bored drill collar. Core may be used.



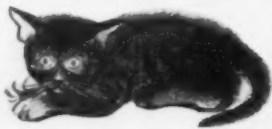
STEADY rest end of trepanning lathe. Cutting head is held in non-revolving drive tube. Workpiece rotates.

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Education

MOVIES: How Firm

Still, movies aid spread of ideas . . . Unify methods . . . Save \$2 million in 4 years.

An estimated \$2 million has been saved in 4 years by the work simplification program at the Tapco plant of Thompson Products, Inc., in Cleveland. And motion pictures and film strips have played an important role by showing ideas at work, how they've increased production and improved job conditions.

This program covers a wide variety of activities, ranging from indoctrination of new employees to a continuous training course for supervisory employees. Its purpose is to continually seek out better ways of doing things.

Tapco officials have learned that one of the best ways to do that is to show supervisory employees how others in the same plant have put their ideas to work to improve operations in their departments.

Movies Do the Job

Actual illustrations of these achievements, either by motion pictures or film strips, are a powerful force in this program. The photographs, and especially the motion pictures, stimulate the thinking of the supervisors, helping to keep them constantly on the alert for ideas that will save time or materials, reduce worker fatigue, or otherwise improve operations.

When a suggested change has proved especially effective, photographs are made of the operation, using the type of photography that is best suited to the job. Occasionally, both movies and still photos are made, many of them in Kodachrome. At the same time, the old method is also photographed for comparison and the improvements shown graphically.

Pictures then are shown to supervisors in appropriate departments at regular training and follow-up meetings. At many of these meetings, discussions are supplemented with motion pictures or film strips. Occasionally films are obtained from outside sources, but many are produced within the plant.

The wide diversity of operations

...ses Training Aid

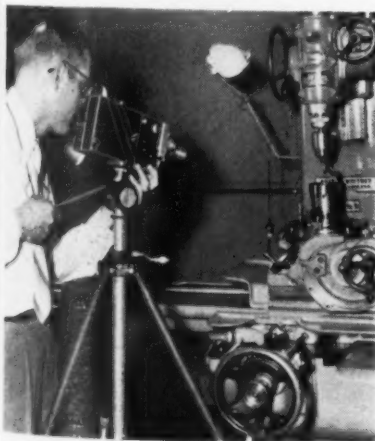
In the Tapco plant makes it possible to use films dealing with a great variety of situations. These range from the receiving department on through materials handling, production, inspection, to shipping, and office practices. When the supervisors see, by the movies and film strips, how other workers in the same plant have solved difficult situations, they perceive similarities to some of their own, and are able to find solutions more readily.

Many of the films also serve later in such functions as indoctrination of new employees, training workers in the operation of new machines.

Used Many Times

Motion pictures also have been found to be of value in other phases of the work simplification program. A typical example was in the inspection department, where a number of workers are engaged in gaging a jet engine component. In organizing this inspection operation, it was found that it was difficult to establish a uniform procedure. Trouble was traced to variations in techniques of different inspectors.

Supervisors in the department worked out the most satisfactory technique for obtaining uniform results, and made a Kodachrome movie showing in detail all the steps in this procedure. This film was shown to all the inspectors involved and the necessity of developing uniform techniques was explained. Subsequently, the film has been used many times in training new employees in the department.



MOVIE camera records the right way to handle a machine operation.

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WRITEOFFS: More for Distress Areas

Industry can now get higher tax writeoffs in labor surplus area . . . Distress areas also get benefit in bidding for government contracts—By A. K. Rannels.

Government last week made two policy revisions designed to help labor surplus areas. Most important is a provision that enables manufacturers to get higher than normal tax writeoffs for expanding or building new facilities in distress areas.

The other Office of Defense Mobilization revision provides that firms in distress areas will receive government contracts when their bids equal those from other areas. However, it eliminates the earlier matching-bid system under which firms in distress areas were advised of low bids from outside. To get the contract all they had to do was match the outside bid.

Retained in the new approved policy is the setaside feature of Defense Manpower Policy No. 4 which enables the government to reserve parts of certain procurement orders for bids from labor surplus areas.

Hedge Against Unemployment

In raising the tax writeoff percentage ODM will first determine the usual amount of certification that would be applicable for the particular project. Then, an additional percentage will be allowed if these facilities are to be constructed in regions certified by the Secretary of Labor as a chronic labor surplus area.

Theoretically this additional concession could mean a 100 pct writeoff. But ODM Director Arthur Flemming says it is unlikely that certificates will be granted for the full amount. Each application will have to stand on its own feet.

Official explanation of the policy change is that it will permit "maximum utilization of manpower in the event of full mobilization."

It is also interpreted in some quarters as going deeper. Some

sources believe it is a calculated step in the as yet unannounced program which the Administration is working up as a hedge against sharp employment drops.

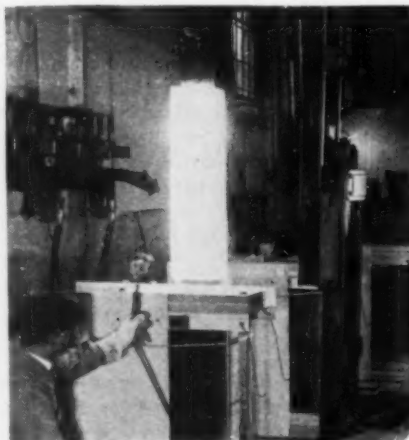
Bolstering this belief is admission by a high official that ODM is even now quietly considering whether tax certificates should be awarded for facilities where expansion goals have already been met. These facilities would serve "as a reserve" in surplus areas.

No Bearing on Steel Mill

None of these factors had any bearing on approval of the certificate for proposed construction of a steel mill in New England, Dr. Flemming told THE IRON AGE.

The decision in this case was based solely on the fact that the proposed mill will produce specialty steels of types where additional capacity can be utilized, he said.

He pointed out that ODM denied certification for \$6 million worth of finishing facilities because no additional capacity is now foreseen as being necessary.



STEEL BILLET 8 in. x 8 in. x 30 in. was brought to rolling temperature in 20 minutes by 60-cycle induction heating. Equipment at West Penn. Power Co., Uniontown, Pa., is used to explore possibilities for heating sections up to 1500 lb.

Dr. Flemming said, however, there is no reason why the backers of the proposed mill could not come back, ask to have its case reopened, and apply for a higher percentage of writeoff under the new policy.

This would mean, however, that the new mill would be restricted to 1 of 3 sites—in or near Providence, Lowell, or Lawrence, Mass.

Unofficially, ODM thinks the proposed steel mill project may go through this time. Reason is that the project now proposed is not on such a grand scale. Its cost would be only about one-tenth that of a former proposal and as a result has a better chance to obtain financial backing.

In connection with the revised policy on government contracts, Labor Dept. so far has designated 17 major and 22 smaller labor surplus areas.

As defined by the government, a major area is one which has at least one central city of 50,000 or more. In order to be rated as Class IV, chronic unemployment would have to be forecast at 6 pct or more of the total labor force in the area.

Listed Labor Surplus

Already designated as major labor surplus areas are:

Lowell and Lawrence, Mass.; Providence, R. I.; Atlantic City, N. J.; Wilkes-Barre, Hazleton, Scranton, Altoona, and Johnstown, Pa.; Winston-Salem, Durham, and Asheville, N. C.; Big Stone Gap, Va.; Newport, Tenn.; Terre Haute, Ind.; and Mayaguez, Ponce, and San Juan, Puerto Rico.

Included as major surplus areas but not necessarily meeting the definition as chronic are Albuquerque, N. M.; Tacoma, Wash., and Kenosha, Wisc.

Some 22 smaller areas, centered by a city of 15,000 up to 50,000, where there is a 6 pct or more labor surplus are "critical."

A substantial portion of these are in the coal mining regions of Pennsylvania and West Virginia. They are eligible for contract help under the revised policy, Defense Manpower Policy No. 4.

MAGNESIUM: Press Promotion Program

Industry accelerates publicity campaign . . . Stress use only where magnesium is best . . . Warehouse selling pays off . . . Discuss magnesium use as fuel—By R. L. Hatschek.

Industry and public unfamiliarity with magnesium is a major obstacle to its increasing growth. Nosedive following World War II was drastic—and now that the Korean war is over and military use is just about holding steady, the magnesium industry is preparing to battle to prevent another slump.

Major weapon will be a stepped-up promotion campaign by the Magnesium Assn. to sell magnesium's advantages to manufacturers. A full-time executive secretary is being hired to lead the organization's campaign.

Poor Uses Hurt

One feature of the industry's project is to recommend magnesium only where it will do a successful job. Poor applications of the metal have actually hurt total sales in the past.

Dow Chemical Co. reports that naming two magnesium distributors, Reliance Steel Co. in the West and A. R. Purdy Co. (See THE IRON AGE, Apr. 30, p. 42) in the East, has paid off.

Their efforts have resulted in a number of new applications as well as winning some manufacturers for magnesium over other metals. In view of these successes, it's very possible Dow may name a warehouse to handle magnesium in the Midwest.

Output Declines

Production of primary magnesium is currently running at a rate of about 72,000 tons annually. Actual output this year will be about 90,000 to 92,000 tons as compared to 105,821 tons last year. A drop, yes, but magnesium production during the period between World War II and the Korean war totaled only 49,125 tons.

Dow, the only producer, is currently operating plants at Freeport

and Velasco, Tex., the latter leased from the government. Five other government-owned plants were shut down in June since the stockpile is well filled and uneconomic production was no longer thought necessary. These are being held on a standby basis.

As usual, there was corridor talk at the Association meeting last week concerning the possibility of a new primary producer entering the field. Many consumers frankly state that they'd like to see another producer. But none of those contacted is planning to take any steps.

Most sensational announcement of the meeting in New York was made by Dr. Joseph H. Scharen, technical director of Reade Manufacturing Co. He stated that he had built and tested a prototype engine using a fuel consisting

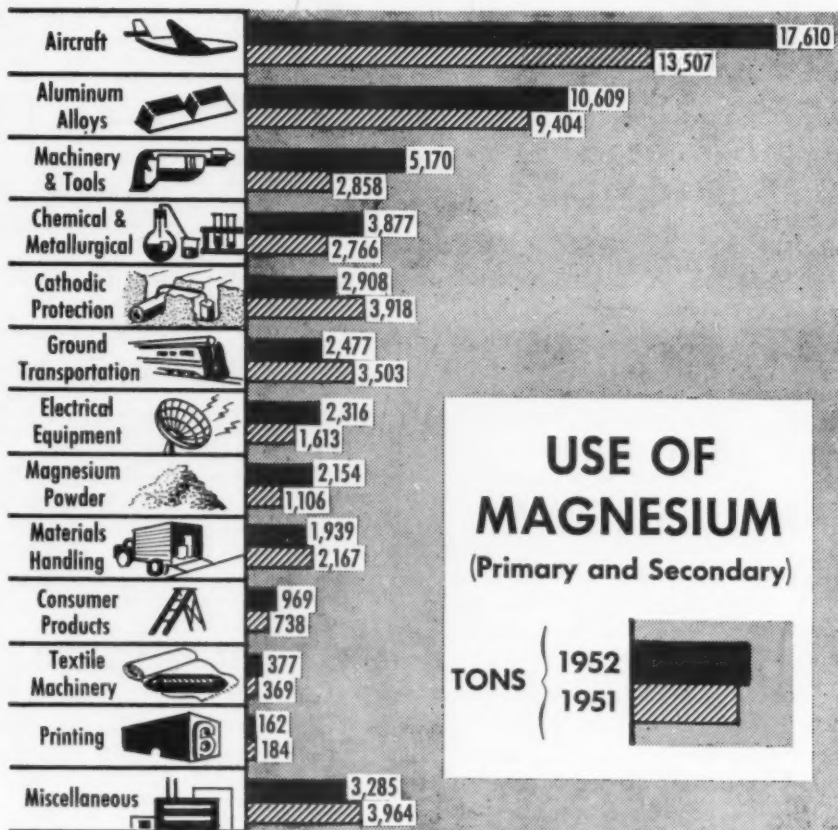
primarily of magnesium powder.

Over 95 pct of the fuel is magnesium powder with a particle size averaging about 5 to 6 microns. Remainder is a stabilizing agent in either liquid or powder form depending on the fuel injection system. Cost is 56¢ per lb and energy release in combustion of 1 lb of the fuel, according to Dr. Scharen, is equivalent to about 600 lb of aviation gasoline.

Air Force Fuel

Since patents have yet to be applied for, no details of the engine itself, the power cycle or the basic principle of the engine could be divulged. It was said, however, that the engine is of simple design, uses fewer than usual moving parts and needs no special construction materials.

Along this line, it's known that National Advisory Committee for Aeronautics has tested a semi-solid fuel containing a healthy proportion of magnesium for use in jet engine afterburners. Air Force is reported to be well along in this program.



Source: Magnesium Assn. estimates

Ordnance:

Shell stretchouts hit Cleveland firms, bring layoffs.

Extension of ammunition production schedules has hit several northern Ohio firms in the Cleveland Ordnance District. According to Lt. Col. B. A. Saholsky, deputy district chief, the stretchout will affect schedules for 4.2 mortar howitzer shells and fuzes.

In making the announcement Ordnance officials said the Defense Dept. hoped to maintain a "substantial number of manufacturers in actual production as the base from which any large future defense needs can spring without requiring extensive plant rearrangements or additional machine tools."

Stretch Out Contracts

Since no reduction in total quantity of shells and fuzes on order is planned the stretchout order merely means contracts will be spread over a longer period of time—about one-third longer according to unofficial estimates.

Extension of production schedules should also give the Army an opportunity to build up its reserve stocks with little or no additional expense and without incurring large contract termination claim liabilities.

Will Bring Layoffs

The stretchout generally should soften the economic blow which usually follows abrupt termination. James Strand, president of Lempco Products, Inc., told THE IRON AGE rescheduling on 4.2 mortar shells would force his company to furlough about 350 workers and cut plant production from two shifts to one. He said the order might also result in more overhead costs but would give his firm an opportunity to weed out high cost suppliers.

About 100 men, almost a complete shift, will also be laid off at Cleveland's Yoder Co. Yoder makes 105 mm howitzer shells. Companies affected by the order which went into effect Nov. 1 include Lempco

Products, Inc., Cleveland Welding Co., Yoder Co. and Weatherhead Co.

Contracts Reported Last Week

Including description, quantity, dollar values, contractor and address. Italics indicate small business representatives.

Shot, APT, 20 MM, 3000000 ea, \$957,000, Pantex Mfg. Corp., Pawtucket, R. I.
Driftmeters, 249, \$1,009,107, Friden Calculating Machine Co., Inc., San Leandro, Calif.

Indicator, 1285 ea, \$133,048, Weston Electrical Instrument Corp., Newark, N. J.
Wheel assemblies, 296 ea, \$71,861, The Goodyear Tire & Rubber Co., Inc., Akron, Ohio.

Mount, truck pedestal, 7000, \$272,930, Stevens Manufacturing Co., Ebensburg, Pa.
Shell, TP, M50A2, MPTS, 60 MM mortar, 75000 ea, \$96,375, Lehigh Foundries, Inc., Easton, Pa.

Switch knife, 500, \$127,500, Powercraft Corp., St. Louis, Mo.

Pliers, 61392, \$51,608, H. Boker & Co., Inc., N. Y.

Repair parts for temperature regulators, 2219, \$63,332, Fulton Syphon Div. Knox-ville, Tenn., *L. L. Davies*.

Cylinder assy, 3415 ea, \$63,621, Erie Manufacturing Co., Milwaukee, Wis.

Pressure switch, V, \$65,989, The Aerotec Corp., Greenwich, Conn.

Bearing, 82000 ea, \$133,660, Sperry Gyroscope Co., Great Neck, N. Y., *George A. Dennis*.

Oxygen regulator, 1947 ea, \$135,823, The Aero Equipment Corp., Bryon, Ohio.

Oil cooler, 269 ea, \$82,180, Alresearch Mfg. Co., Div. of the Garrett Corp, Los Angeles, Calif.

Reel, aircraft mooring, V, \$64,514, The D. L. Auld Co., Columbus, Ohio.

Controller, 204 ea, \$96,812, The Bristol Co., Waterbury, Conn.

Maintenance parts for R5D aircraft, V, \$96,186, Douglas Aircraft Co., Santa Monica, Calif., *N. H. Shappell*.

Engine parts, V, \$81,229, Bendix Products Div., South Bend, Ind., *G. I. Lyman*.

Hydraulic valve, 627 ea, \$72,105, Wm. R. Whittaker Co., Los Angeles, Calif.

Thermostat, turbine, oil cooler, exchanger assys, V, \$60,707, Alresearch Mfg. Co., Div. of The Garrett Co., Los Angeles, Calif.

Valve assy, 171 ea, \$118,845, Stratos Div. Bay Shore, L. I.

Indicator, tachometer, 1533 ea, \$148,088, General Electric Co., Philadelphia, Pa.

Adapter, scar aero 1A, 4465 ea, \$75,280, Dittmore & Freimuth Co., Cudahy, Wis.

Wheel assys and abrasive type shoe, V, \$53,091, The B. F. Goodrich Co., Akron, Ohio.

Maintenance parts used on instruments, 323 ea, \$55,680, General Electric Co., Philadelphia, Pa.

Voltage regulator and AC generator, V, \$58,613, The Leece-Neville Co., Cleveland, Ohio.

Oxygen recharge equipment, V, \$124,700, Walter Kidde & Co., Belleville, N. J., *H. S. Klimaski*.

Spare parts for electric drive, V, \$107,479, The W. L. Maxson Corp., N. Y.

Fuel flowmeter indicators, 283, \$100,196, Bendix Aviation Corp., Teterboro, N. J.

Apparatus, gyroscopic test meter, 126 ea, \$75,865, Marion Screw Products, Marion, Indiana.

Junction box, 148 ea, \$159,681, Schuttig & Co., Inc., Washington, D. C.

Transmit Power Without Wires

Experimental long-range electric power transmission without wires has been successfully conducted in Italy. The scientists, working under the auspices of the Italian Ministry of Defense, used equipment supplied

by Alocchio Bacchini of Milan.

Power transmission without wires works on the principle of reversibility of a magnetic field—similar to radio and television transmission. Major difference is the far greater amount of energy transmitted over the tightly controlled beam.

Set New Selenium Export Quotas

U. S. Bureau of Foreign Commerce has established the export quota for selenium for fourth quarter 1953 and first quarter 1954 at 6000 pounds selenium content. This quota is the same as for second and third quarters 1953.

Relations

Plan Fairless-McDonald Visits

Joint plant visits by Benjamin F. Fairless, U. S. Steel Corp. chairman, and David J. McDonald, United Steelworkers of America president, are now definitely scheduled to start this month. Aim is better union-management understanding at the plant level.

Visits will start in U. S. Steel's Cleveland-Lorain District plants Nov. 17. On Nov. 23, visits to Pittsburgh District plants will get underway. Trips to other operations will be scheduled later.

Plan for such visits was advanced by Mr. Fairless at the end of the 1952 steel strike, when he appeared before the USW Wage Policy Committee in Washington and announced a pact made the day before with the late Philip Murray for something new in respect to labor-management relationships.

Shortly after Mr. McDonald's election as USW president he discussed the visit with Mr. Fairless. The November dates were the earliest that could be worked out because of the heavy obligations of both.

Last week, announcing the start of the visits, both Mr. Fairless and Mr. McDonald agreed that "there is no better way to look over our mutual problems in hopes of developing a better relationship and a better understanding of each other than in just this way."

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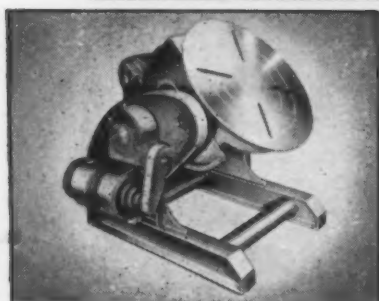


Everyone's busy at controls around this railroad. Chief Keokuk indicates that No. 999 is on time; Junior throws the switch; and Princess Wenatchee makes sure that signals are all in order.



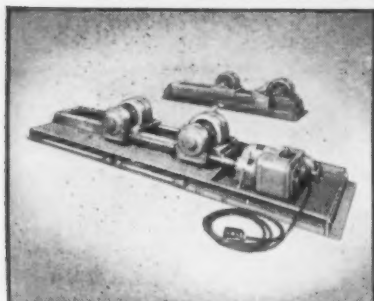
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Industrial Briefs

First in Line . . . LAMSON CORP., Delaware, manufacturer of belt and roller conveyors, becomes the first firm to offer a completely integrated line of materials handling equipment and engineering services through its acquisition of Mobilift Corp., Portland, Ore. Mobilift, makers of fork lift trucks, will be known as Lamson Mobilift Corp.

Inventor Speaks . . . Ilario Properzi, inventor of the continuous casting machine that bears his name, spoke yesterday before the annual meeting of The Wire Assn. He cited many of the new developments and advantages of continuous casting, stressing that smaller firms could compete with large ones in production of redraw rod.

Elbow Room . . . A. MILNE & CO. has moved its Chicago office and warehouse from 17 N. May St. to larger quarters at 2080 N. Hawthorne Ave., Melrose Park, Ill.

Gets Contract . . . STANDARD BOILER & PLATE IRON CO., Pittsburgh, has been awarded a contract for the complete relining of U. S. Steel Corp.'s National Tube Div.'s #4 blast furnace at Lorain, Ohio.

Cincinnati Plant . . . SOLAR STEEL CORP. formally opened its new steel plant in Cincinnati this week.

It's Official . . . ALLIS-CHALMERS MFG. CO. officially assumed operation of The Buda Co., Harvey, Ill., recently. It will be operated as a division of Allis-Chalmers.

Big Present . . . NATIONAL LEAD CO.'s Doehler-Jarvis Div. presented the College of Engineering at Cornell University with an exact duplicate of the die casting machines which turn out large quantities of castings for automobiles, aircraft, household appliances and office equipment.

Formally Opened . . . GENERAL FUSING CORP. formally opened its newly established plant at 705 Atherton St., Hayward, Calif., last month.

Leases Building . . . SEAPORCEL METALS, INC., reports that its Long Beach, Calif., affiliate, Seaporcel Pacific, Inc., has leased a building adjoining its plant that gives the company 15,000 additional sq ft of floor space.

Warehouse Opened . . . THE CARPENTER STEEL CO. celebrated the opening of its new mill-branch warehouse and office in Milwaukee at 4152 N. 35th St. with an open house last week.

New Prexy . . . CONVEYOR EQUIPMENT MANUFACTURERS ASSN., Washington, elected R. F. Tomlinson, manager, Conveyor Dept., The Oliver Corp., A. B. Farquhar Div., York, Pa., as president.

Breaking Records . . . AMERICAN MACHINE & FOUNDRY CO., New York, did a record-breaking business in the first three quarters of this year, with volume for the period higher than in all of 1952. Operating net income reached an all-time high for 9 months of \$3,024,000.

Purchase . . . ROCKWELL MFG. CO. has purchased Callander Foundry & Mfg. Co. Ltd., of Guelph, Ont. The firm will continue operations under present management, using the present name as a wholly-owned Rockwell subsidiary.

Expansion . . . WESTINGHOUSE ELECTRIC CORP., Pittsburgh, will spend more than \$4 million at the Appliance Div. plant in Springfield, Mass., as the first step in an extensive expansion program.

Adds to Line . . . ALUMINUM CO. OF AMERICA reports that The Budd Co. has added to its line of steel wheels the aluminum forged disc wheel to help fill a growing demand in the trucking industry. The wheel is forged for Budd at the Cleveland Works of Alcoa on a 3000-ton press.

Sales Office . . . BRIDGEPORT BRASS CO. has opened a new sales office in the Federal Square Bldg., Grand Rapids, Mich. Thomas H. Williams will be in charge of the new office.

Company Formed . . . CURRY AIR SHEAR CORP. has been established with headquarters in the Oliver Bldg., Pittsburgh. The new company will manufacture a line of air-operated shears for use in the steel and general manufacturing industries.

New Moniker . . . ALUMINUM SMELTERS RESEARCH INSTITUTE is the new name of the Aluminum Research Institute, Chicago.

for Greater Strength with Lighter Weight in modern material handling equipment



The increasing use of the Evans DF Loader reflects the progress of railroads toward more efficient material handling methods.

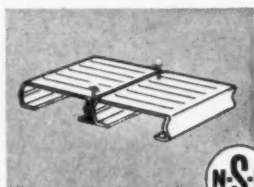
In the DF Loader there is high strength with minimum weight through the use of N-A-X HIGH-TENSILE steel. This low-alloy steel has 50% greater strength than mild carbon steel, with greater resistance to corrosion with either painted or unpainted surfaces.

You can get the same results as Evans. Your product can be made stronger, lighter in weight and longer-lasting, when you specify N-A-X HIGH-TENSILE steel.



THE EVANS DF LOADER is a product of Evans Products Co., Plymouth, Mich. DF means Damage - Free, Dunnage - Free.

NAILABLE STEEL FLOORING for boxcars, flatcars and gondolas is made of N-A-X HIGH-TENSILE steel, and is a product of Steel Floor Division, Great Lakes Steel Corporation.



Engineering data on these products available upon request to the manufacturers.

The "Wonder Bar," a section of which is shown at left, is a vital part of the Evans DF Loader. It is a wooden bar reinforced by a Z-bar made of N-A-X HIGH-TENSILE.

The "Wonder Bar," when locked into place, secures all kinds of lading. It is strong enough to resist shifting load stresses in moving boxcars, yet so light that one man can lift it into position. The DF Loader provides real operating economies for both railroads and shippers.

Another modern product for efficient transportation equipment is Nailable Steel Flooring, also made of N-A-X HIGH-TENSILE steel.

GREAT LAKES STEEL CORPORATION

N-A-X Alloy Division

Ecorse, Detroit 29, Mich.

NATIONAL STEEL CORPORATION



Science Brightens Car Color Schemes

New Chryslers spotlight auto industry's emphasis on color styling . . . Coordinate car colors on scientific basis . . . Stress color's three dimensions—By R. D. Raddant.

"We have had some terrible examples of the use of chrome trim. You can't put it on with a trowel . . . At one time I think automobile interiors were inspired by the decor of the old fashioned pullman washroom."

These salty comments by James C. Zeder, Chrysler Corp. vice-president and director of engineering and research, point directly to the changing philosophy of the auto industry toward styling, "from intuition and personal choice to an outstanding science, as basic as engineering itself."

Select Scientifically . . . Of course, Mr. Zeder's emphasis has its purpose, to call attention to Chrysler's new enthusiasm on styling and color. This year's new models throughout all Chrysler divisions features interiors and color combinations designed with a scientific zest that is new to Chrysler if not the entire industry.

Chrysler has approached color and fabric with a set of well-defined scientific principles. These start with the physical origin of color itself, the chemical properties of paints and fabrics, and the psychology of the buyer.

3D Color . . . An example of psychological probing is the possibility of a correlation between the popularity of blue, which leads all color choices, with the fact that in the retina of the eye are more cones that receive blue than any other color. Other factors in color choice are the individual's interpretation, association, tradition, and past experience.

In color matching Chrysler stylists prefer to say coordinating, designers follow the idea that color is three dimensional. The three di-

mensions are hue, value (the addition of white or black) and chroma (degree of purity).

This leads to the concept of color-coordination, which Chrysler divisions launched this year by coordinating both the interior and exterior color combination of each car on a scientific basis.

Who Knows Best? . . . Using the three dimensions, colors are coordinated not only by the eye, but by scientific applications of the three dimensions of hue, value, and chroma. Stylists don't like to emphasize the idea that scientific choice of color combinations may be better than individual taste. But the Plymouth Belvedere is completely color-coordinated.

This means that after choosing the basic color, the entire interior and exterior combinations are laid down by Chrysler stylist. Will this pay off? Some 1953 sales results indicate it will.



CLAY used to build experimental car models at Ford is extruded through aluminum discs through which slots of various designs have been punched.

Brown Leads Sales . . . In the 1953 Chrysler New Yorker hardtop, only one color, brown, was color-coordinated. Brown is not normally a popular color, but in this particular instance it accounted for almost half of the sales. Brown, called cinnamon for sales purposes, gained 48.3 pct of sales in this line, followed by green, 30.1 pct; gray, 21.4 pct; and red, 0.02 pct.

Seat fabrics have come in for considerable attention in new styling theories and Chrysler has done a great deal in making attractive vinyl fabrics.

Need Seat Covers? . . . There is only one obvious flaw in the entire picture. After stylists and researchers have spent millions in developing durable, non-staining fabrics and gone to extreme lengths to coordinate colors, the buyer is apt to take his new car right to the nearest supply store and purchase a set of clashing seat covers.

Most auto companies are now trying to discourage this practice. New fabrics usually do not fade or discolor and are easily washable, long lasting.

Plans New Car . . . Slightly disguising it as a Special Product Div., Ford Motor Co. last week revealed establishment of a new division which will definitely develop and manufacture a new car. The announcement made no reference to a new car to round out the field of Ford, Mercury and Lincoln, but Detroit consensus is that the new division, under William C. Ford, has the job of doing just that.

William Ford is the youngest son of the late Edsel Ford and grandson of Henry Ford. Henry Ford II is president of Ford Motor Co., while Benson Ford is general manager of Lincoln-Mercury Div. Now, at 28, the youngest of the three brothers is taking over his own division.

Compete With Buick . . . It is generally believed that the new car

will be at the top of the price schedule. But another theory is that Lincoln will continue as the luxury model, with the new product in the upper-middle bracket, similar in price to DeSoto, Buick, or Oldsmobile.

"We have been working in a number of research areas related to new automotive products," Mr. Ford said. "While we do not yet wish to set any introduction dates, we expect to have our own manufacturing facilities and sales organization operating by the time we have a new car ready."

Merger By Rumor . . . On the basis of rumor, Nash is the most merged of all the automotive independents. Scarcely a week went by this year without at least one new merger story going around.

Last week George W. Mason, president of Nash-Kelvinator Corp., issued a ringing defense of his company's position and of the independent group as a whole. But when pressed by reporters, he admitted talks with A. B. Barit, Hudson president, over some type of combined action.

"Ridiculous" . . . "There is much to be accomplished by way of closer combination between independent companies," he said. His talk also indicated he had explored, in his own mind at least, such combinations as a basic car engine, combined plant facilities, and uniform design of parts.

Then, addressing his dealers at a preview showing of 1954 Nash models, Mr. Mason launched into a pep talk that was obviously geared to his company's disappointing second half of this year.

"There has been a lot said and written recently about the ability of the smaller automobile manufacturing companies to survive in the face of Big Three competition. Some writers are saying the only way the smaller producers can survive is through merger. To this I say, ridiculous!"

How It Figures . . . He pointed out his company's working capital

was \$18 million in 1940 compared with more than \$67 million at present.

He conceded that the independent's cost per unit tooling is higher, but that this is offset by other factors. In Nash's case it is a high degree of integration in the company's Kenosha, Wis., and Milwaukee plants. Nash has its own gray iron foundry, its own forge shop and stamping plant. The company makes its own axles, differentials, other parts.

Fight Own Battles . . . But he reported his company is undertaking an "aggressive campaign internally" to cut costs. He cited excessive costs of conversion steel as one of his company's 1953 hardships. He reported that in the fiscal year ending Sept. 30 Nash paid \$10.2 million in excessive steel costs.

However, he stated that in most cases independents can purchase as cheaply as the larger manufacturers and in normal times don't pay more for steel, tires, textiles and the like.

Automotive Production

(U. S. and Canada Combined)

WEEK ENDING	CAR	TRUCKS
Nov. 7, 1953..	121,141*	14,875*
Oct. 31, 1953..	129,775	15,536
Nov. 8, 1952..	111,845	31,765
Nov. 1, 1952..	122,888	32,149

*Estimated: Source Ward's Reports

Second GM Fire Not Serious

Fire broke out in General Motors' Willow Run transmission plant last Sunday night, only a few days after GM had announced first transmission production from Willow Run facilities.

Fortunately, the blaze in the heat-treat department was put out within 10 minutes and damage was slight. Work in the department had to be stopped for the remainder of the shift because of cyanide fumes that resulted when water from the sprinkler system got into 5 cyanide pots. Transmission production was not affected.

Willow Run started transmission production in limited quantities last week. Full output is expected in December.

THE BULL OF THE WOODS

By J. R. Williams



Latrobe

first again!

THIS TIME ... IT'S

XL HIGH SPEED TOOL STEELS *

regular analysis high speed steels

...plus...

NEW SULPHIDE LUBRICANTS

*... Additives
made possible*

by the "DESEGATIZED" process
now available in M-1, M-2 and M-10 types

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*Patent applied for.

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SALES AGENTS

DALLAS DENVER HOUSTON SALT LAKE CITY SEATTLE WICHITA

EUROPEAN OFFICES IN

GENEVA BRUSSELS MILAN PARIS ROTTERDAM

This Week in Washington

Who Will Hold Military Purse Strings?

Fight shaping up on Wilson plan to establish civilian control over military spending . . . Support comes from many quarters . . . But military opposed—By G. H. Baker.

Defense Secretary Charles E. Wilson faces a tough selling job in his efforts to establish civilian control over military spending.

Both Mr. Wilson and Navy Secretary Robert B. Anderson are now convinced that Defense Dept. procurement can best be administered by experienced industrial executives, not by career military men. But professional officers are ready to fight any move that would take spending decisions out of their hands.

Belief that the taxpayers can get more for their procurement dollar has been quietly discussed for many weeks. Disclosure that Mr. Wilson is considering putting Army-Navy-Air Force purse strings in civilian hands came last week when Secretary Anderson let it be known in a Senate hearing that he is shopping around for a qualified civilian to become the Navy's first business manager.

Further committee testimony brought out additional endorsement for civilian control from former Defense Secretary Robert A. Lovett and from Ferdinand Eberstadt, former high Pentagon official who co-authored the Army-Navy-Air Force unification law.

Air Estimate Off . . . Mr. Eberstadt maintains that accurate accounting is impossible under the present system of fiscal control. His views are backed substantially by Mr. Lovett, who says he was often unable to get adequate inventory and financial data from the three services when he was Secretary of Defense.

As an illustration, he points out that the Air Force estimated in 1951 it would use \$210 million worth of new uniforms annually.

Turned out the most it can use in any year is \$60 million worth.

More Air Wings . . . President Eisenhower's forthcoming budget recommendations will include substantial increases in Air Force funds, in the opinion of Sen. George A. Smathers, D., Fla. The Air Force currently is building toward an interim goal of 120 wings. Joint Chiefs of Staff have recommended 127 wings for the fiscal year 1955 budget, and Sen. Smathers believes a 143-wing flying force is the "minimum" size consistent with national security.

If Congress adopts this line of defense reasoning next year, the added appropriations may offset the \$5 billion trimmed this year.

Deadlocked on Tariffs . . . Threat of a deadlock on tariff views among members of Clarence Randall's Commission on Foreign Economic Policy raises the possibility that Congress will be handed an

inconclusive final report next spring.

Public hearings in the past 2 weeks have pointed up a sharp divergence of opinion among commission members. Chairman Randall has made it clear that he has an open mind on the over-all trade and tariff problem, but other members of his 17-man group have been openly critical of various presentations made to the commission.

Mr. Randall's next big problem is to reconcile the views of the "free trade" and "high tariff" members of his commission so that he may give a final report to President Eisenhower and to Congress by Mar. 6.

One "high tariff" group, the Committee of Industry, Agriculture, and Labor, is demanding Mr. Randall's resignation on the ground that he is "biased in favor of foreign imports."

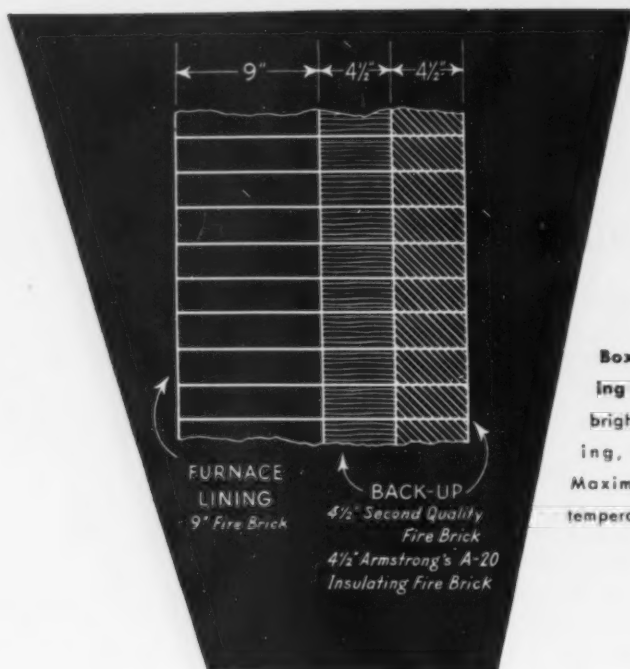
Atom Engines Musts . . . Installation of atomic engines in U. S. warships of the future may become standard Navy practice. Admiral Robert B. Carney, Chief of Naval Operations, says the switch is a "must" if the U. S. is to maintain supremacy of the seas.

Atomic engines for naval use are no longer in the experimental stage. They are here. Atom-powered subs have met all tests successfully. Admiral Carney says bluntly that naval supremacy in the future may well be assigned the first nation that converts from oil to atoms.

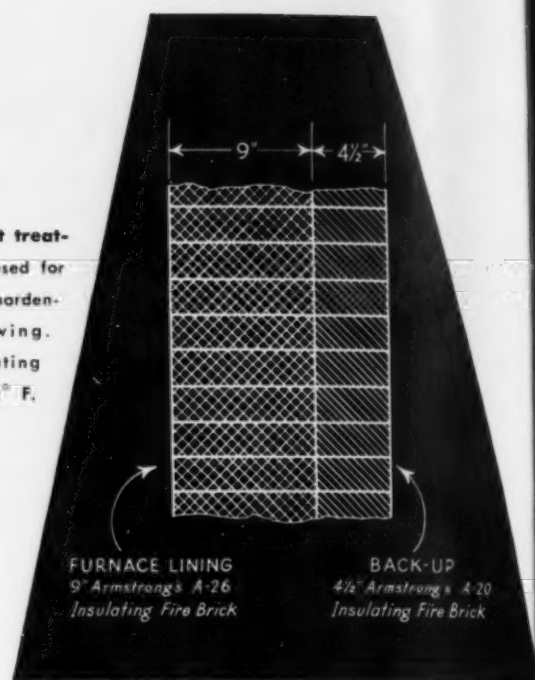
Modernization programs now in effect for much of the U. S. fleet make World War II sea-battle weapons and strategy appear highly obsolete. Navy is now planning, for example, to equip its ships with surface-to-surface, surface-to-air, and air-to-surface guided missiles.

Join in Seaway Project . . . U. S. participation in the construction of a St. Lawrence Seaway was





Box-type heat treating furnace: used for bright brazing, hardening, and drawing. Maximum operating temperature: 2500° F.



How a 25% reduction in wall thickness lowered heat storage by 77%

This box-type furnace illustrates how a simple change in wall construction can often produce valuable reductions in heat storage and heat loss.

In the first design, 9" of regular fire brick line the walls. For back-up, 4½" of second quality fire brick and 4½" of Armstrong's A-20 Insulating Fire Brick have been used. With this construction, heat storage is 90,730 Btu's per square foot of wall area, while heat loss through the walls is 505 Btu's per square foot. The weight of the walls is 164 lbs. per square foot.

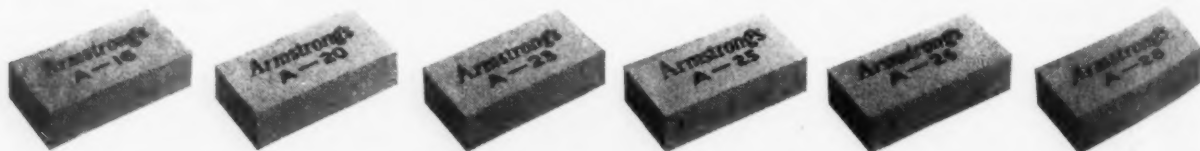
Note the improved performance of the second construction. Here, 9" of Armstrong's A-26 Insulating Fire Brick have been substituted for the 9" fire brick lining, while the back-up is 4½" of A-20. With this more modern design, wall weight is only 48 lbs. per square foot . . . a 70% reduction. Heat

loss through furnace walls is cut by 28% to 362 Btu's per hour per square foot.

Most important of all, heat storage is reduced 77%—to only 20,860 Btu's per square foot. In a utility furnace of this type, this reduction means valuable fuel savings, faster operating cycles, increased production.

Do you have a furnace problem?

Getting top operating efficiency from a furnace calls for a sound knowledge of fire brick and furnace construction. That's why it's always a good idea to call in your Armstrong engineer whenever you have a furnace lining or rebuilding job. He'll be glad to help you select the best brick to suit your needs. For his help, call your nearest Armstrong office or write Armstrong Cork Co., 2711 Susquehanna St., Lancaster, Pa.



ARMSTRONG'S INSULATING REFRACTORIES

a step closer this week, following President Eisenhower's designation of the State of New York as the official U. S. agent for participation in joint U. S.-Canadian hydroelectric development on the St. Lawrence.

An executive order issued by Mr. Eisenhower authorizes New York State to join the Province of Ontario in constructing the electric power phases of the seaway project near Massena, N. Y. New York State's share of the total power cost is estimated at \$450 million.

The new White House order also sets up a U. S. section of the St. Lawrence River joint board of engineers. The U. S. members are Army Secretary Robert T. B. Stevens and Jerome Kuykendall, Federal Power Commission chairman. Joint board of engineers is to supervise plans and specifications for the power phases of the project, and to follow up on actual construction.

Licensing Fee Boosts Scheduled

Patent and other licensing fees are to be revised upward by the Federal Government to sufficient levels to virtually make such activities self-supporting.

Budget Bureau has issued a circular to this effect to all federal agencies concerned. Each agency is to offer opportunity for all interested parties to be heard on all proposed fee changes.

Budget explains that the government is spending about \$50 million a year in licensing and registration activities. On the other hand, the present scale of fees brings in only about \$20 million—a deficit of \$30 million to be made up from the general taxes.

Periodic Review

It is felt by the Administration that while most such licenses are in the public interest, at the same time most of them also are of particular benefit to the individual, group, or firm which obtain them.

This proposed action is not only supported by the White House but has been authorized by law during the 82nd Congress. Fee schedules are to be reviewed every 2 years from now on.

Minerals:

Exploration aid is ended on certain strategic minerals.

Defense Minerals Exploration Administration has removed refractory grade bauxite, industrial diamonds, thorium, and crocidolite and amosite types of asbestos from the list of strategic minerals to get exploratory aid.

As an additional tightening up of the program, DMEA will no longer contribute more than 75 pct to the cost of any project. Previously, some exploratory activities could qualify up to 90 pct.

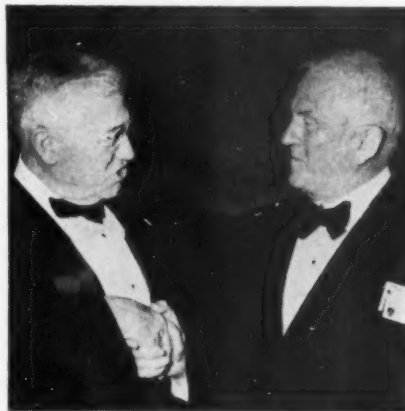
Potentially eligible for 75 pct aid are beryl, cobalt, columbium, manganese, muscovite and film type mica, nickel, platinum, tantalum, tungsten, uranium, and crysotile asbestos.

A 50 pct top has been put on programs for exploratory work in connection with chromium, copper and molybdenum.

Atoms to Heat Hanford Buildings

Atomic energy will be put to work on the relatively lowly task of heating buildings at AEC's Hanford, Wash., plant. Waste heat from the reactor cooling water will be used to warm up incoming air.

Estimates put the installation cost at about \$614,000, annual operating costs at \$2200. Comparable steam system would cost \$170,000 to install but the \$59,000



DEAN D. V. Terrell, (left) new president of American Society of Civil Engineers, welcomes R. Dobbin, president of the Engineering Institute of Canada, to the recent ASCE meeting in New York.

annual saving on fuel is expected to pay off the difference in 7½ years.

To eliminate radioactivity, water from the reactor will go through a heat exchanger, raising the temperature of water in a separate piping system. This in turn will supply heat to the air conditioning system.

Set New Iron, Steel Rail Rates

New alternative freight rate mileage scales for iron and steel products moving in southern territory went into effect last Friday, Nov. 6, in an effort to offer more competition to truck fleets.

Generally, the new rates provide two mileage scales—one subject to a carload minimum rate of 40,000 lb and the other subject to an 80,000-lb minimum. They superseded previous higher scales subject to 40,000 and 60,000-lb minimums.

Eastern railroads have also filed a similar revised rate schedule to bring into line with southern roads the rates on steel moving into southern territory. It is slated to become effective on Nov. 21.

Lift Steel Export License Need

Carbon steel ingots and bars, billets, blooms, all grades of pig iron, and numerous other iron and steel products may now be shipped to most countries without an individual export license under a new ruling by the U. S. Bureau of Foreign Commerce.

Individual licenses will still be required for exports of these items to Hong Kong, Macao, and Soviet bloc countries. No exports will be permitted to China or North Korea.

Okay Railway Express Renewal

Renewal of the contract between Railway Express Agency and major railroads for handling express shipments has been okayed by Interstate Commerce Commission.

It is for a period of 20 years, beginning next Mar. 1 when the present contract expires. Operations will continue substantially the same as in the past.

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**OVERHEAD
ELECTRIC
TRAVELING**

CRANES

you will have fast, safe, dependable materials handling with an extra margin of safety for overloading under peak or emergency operation—the best mechanical and electrical accessory equipment and controls that can be obtained—precise manipulation, minimum maintenance, and maximum efficiency—integrated engineering design and construction of the highest quality. Ask for Catalogs SE-108 and HL-115-R.

NORTHERN HI-LIFT HOISTS

you will get an extra quality, high hook lift, heavy duty type hoist—the only hoist of this type available. It ranges in capacities from one to 15 tons (100 tons in stationary types) and is adapted for I-beam, monorail or tramrail systems—for floor or cab control—single or variable speeds. Other models also include: double hook, base mounted, and lug suspension hoists. Ask for Bulletin H-113.

NORTHERN TRAVELATORS

you will save time, maintain production, increase safety with a low cost, simple device which converts your hand powered cranes to motorized control. It can be easily installed by your own mechanics in a few hours without dismantling your present crane. Ask for Bulletin T-105.

NORTHERN ENGINEERING WORKS

210 CHENE ST., DETROIT 7, MICHIGAN

Steelmakers Sum Up New Techniques

Speakers at last week's regional AISI meeting told of latest wrinkles in Coast mills . . . Kaiser adds new beneficiation plant . . . Scrap education pays off—By T. M. Rohan.

One of the better crowds in years attended last week's annual American Iron and Steel Institute regional technical meeting in San Francisco to hear the latest in steelmaking theory, practice.

K. B. Powell, Kaiser raw materials superintendent, said a new beneficiation plant will be started at Eagle Mountain ore deposit in December. This will raise iron content to 55.85 pct compared to present yield of 54 and 50.9 pct Fe.

Ore deposits are proved adequate for 25 years operation of three blast furnaces at Fontana 163 miles away. Direct operating costs for 12 months ended June 30, 1953, were 26¢ per net ton all material. About 1.7 million tons of ore were obtained from 3.3 million total tons of material mined.

Ingot Mold Studies . . . John H. Shank, Colorado Fuel & Iron Corp. quality control superintendent, said ingot mold life there is 80 heats without mold coating. After years of experimentation a shallow corrugation type is being used. Molds are made of pigged basic furnace iron with silicon briquettes to meet analysis. Blast furnace and openhearth capacities at the plant are closely matched, allowing only infrequent runs on foundry iron.

R. J. Tremblay, Bethlehem-Pacific Los Angeles plant superintendent, described operation of the all-electric furnace mill on production runs with 100 pct scrap charge. Heat times of 3 hours, 45 min tap to tap have been made on 75-ton capacity furnaces charging 85-ton net heats. Power consumption is 500 kw/hr.

Educate Scrap Dealers . . . E. W. Hunziker, U. S. Steel's Pittsburg,

Calif., openhearth superintendent, said that the mill's educational program for scrap dealers has paid off in better scrap and less openhearth trouble. Scrap from 26 sources is identified by code painted on the material and returned to dealers if unsatisfactory, dealer paying 2-way transportation.

Twelve Pct More . . . Dr. A. M. Zarem, Stanford Research Los Angeles manager, said the West's industrial future depends on its ability to rise from the branch office and plant stage to a primary producing center in local and national markets.

Max D. Howell, Institute executive vice-president, predicted western steel production will be 6.9 million tons or 12 pct over

1951, best previous year. He added the district capacity according to Institute figures has gone up 250 pct in the last 15 years.

Second Aluminum Cutback . . . Kaiser's Trentwood, Wash., aluminum rolling mill last week announced its second cutback in as many weeks of 300 additional workers due to inventory pile-up in hands of distributors. Additional factor may be freight rates to midwest and eastern markets.

Originally the split was about 80/20 in favor of out-of-area markets but in recent years has been brought to about 60/40. Overall employment is still 600 over a year ago. Basic aluminum reduction at the Mead, Wash., plant remains largely unaffected.

Three ferroalloy furnaces have also closed operations in Oregon and Washington due to dwindling markets, freeing about 50,000 kw interruptible power.

Power Outlook Good . . . Overall power outlook in the Pacific Northwest remained good last week. Bonneville Power officials reported rainfall so far "slightly above median" indicating most of the interruptible power can be continued in service through the year.

A report that Reynolds Metals is planning a fabrication plant near Umatilla, Ore., and McNary Dam appeared doubtful. BPA officials denied any negotiations for firm power were under way. Recent 20-year contract commitments of 1.5 million kw to area utilities would forestall any firm power for at least 5 years.

Only major block of power in sight is Chelan County public utility district. This would have about 100,000 kw in a few years at cost price of about \$23 per kw year. Reynolds currently has about 240,000 kw between its Troutdale and Longview, Wash., reduction plants, most of the output going to the Phoenix extrusion mill.



LOW COST operation of this and other Bethlehem Pacific Coast electric furnaces was a featured report at last week's regional AISI meeting in San Francisco.

Getting right speed selection for tough forgings— no problem with a CH machine!



PRODUCTION DATA—Job: Cablair Products Co., Culver City, Calif.—Milling 8630 Steel forging.
Machine: 10 hp No. 3 Model CH Plain • Cutters: Two HSS 10½" side milling cutters (16 blades each). • Spindle Speed: 18 rpm • Feed: ½" per min. • Depth of Cut: 1½" max. (¾" per cutter) • Width of Cut: 3¼" max.

MILLING tough steel forgings might have presented a difficult production problem if this manufacturer had not owned a versatile No. 3CH miller. Tough material, the necessary speeds and size of cut combined to produce excessive cutter wear. An average of only 18 pieces could be machined before cutters had to be reground. This situation, unremedied, would have seriously restricted output and increased costs.

However, the CH miller's design provides a wide range of 24 spindle speeds (15 to 1500rpm). By utilizing this feature, and selecting an appropriate coolant, the manufacturer increased cutter life by over 500%! Today, uninterrupted runs of 100 pieces are average.

This case is only one of hundreds where CH design features provide the versatility to easily meet common as well as unusual machining problems.

For details on Kearney & Trecker CH machines, contact your representative or write for illustrated brochure.



KEARNEY & TRECKER CORPORATION

6784 W. National Avenue

Milwaukee 14, Wisconsin

**This Kearney & Trecker No. 3CH
10 hp Milling
Machine mills 100
steel forgings
between cutter
grinds. Previous
average was
only 18 pieces!**



Machine Tool High Spots

Seek Way to Stop New Order Slide

Automation, dynamic equipment policy for users may be way to stop new business drop . . . Tell Berna says 20 pct of production equipment is obsolete—By E. J. Egan, Jr.

Machine tool builders constantly tread an all-important industry stairway of new orders and shipments. Although they would much prefer to keep climbing these stairs, it is not exactly a matter of their choice whether they go up or down. Wars, and the aftermath of wars, have determined what happened to the industry, during the past decade and a half.

The chart on this page shows that the peak of new machine tool orders since World War II occurred in the first quarter of 1951. This was due almost solely to the Korean emergency. Since that time the industry has been "going downstairs."

Tariff walls against foreign tool imports, and a continuing though reduced flow of defense orders will help maintain a certain level of activity. But the industry's real hope lies in the sale of new tools to cost-conscious manufacturers both at home and abroad.

How to Stop Slide . . . Domestically, the solution to the downward new order trend may be automation, and a dynamic equipment policy.

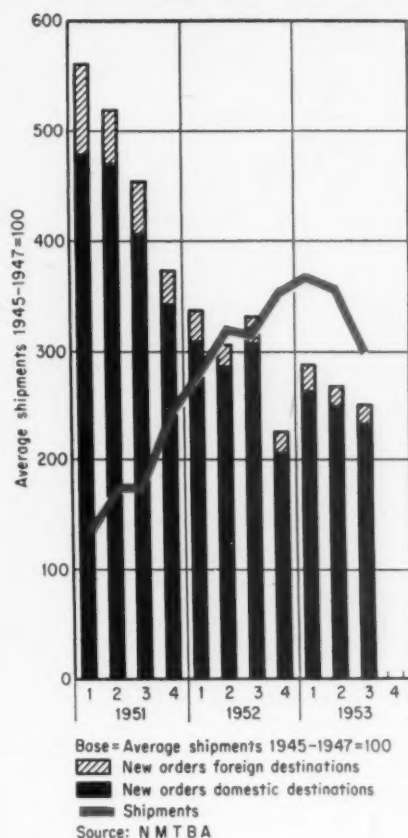
Automation is being applied to an increasing number of mass production industries. Faster, more complete automatic processing of parts on special-purpose and multi-purpose machine tools is the goal of every builder.

But as new automatic equipment come into being, the prospective purchaser seeks a reliable guide to determine, not whether he can afford to buy it but whether he can afford not to buy it.

Study Replacement . . . Problems involved in determining the proper timing of capital goods ac-

quisition and replacement are complex. But a long-range program to study the economic factors which influence equipment purchases has been started.

Machine Tool Order Trends



Education and research in the field of scientific equipment analysis will be carried on through a newly-founded National Center of Education and Research in Dynamic Equipment Policy.

How It Works . . . Established at Illinois Institute of Technology in Chicago, the Center is jointly sponsored by Illinois Institute, the Council for Technological Advancement along with the Machin-

ery and Allied Products Institute.

Courses of instruction in Dynamic Equipment Policy will be taught at both the graduate and general educational levels.

Overrate Efficiency . . . In line with the problem of machine tool replacement, Tell Berna, general manager, National Machine Tool Builders' Assn. last week said America's mass production industries are not nearly so efficient as they think they are.

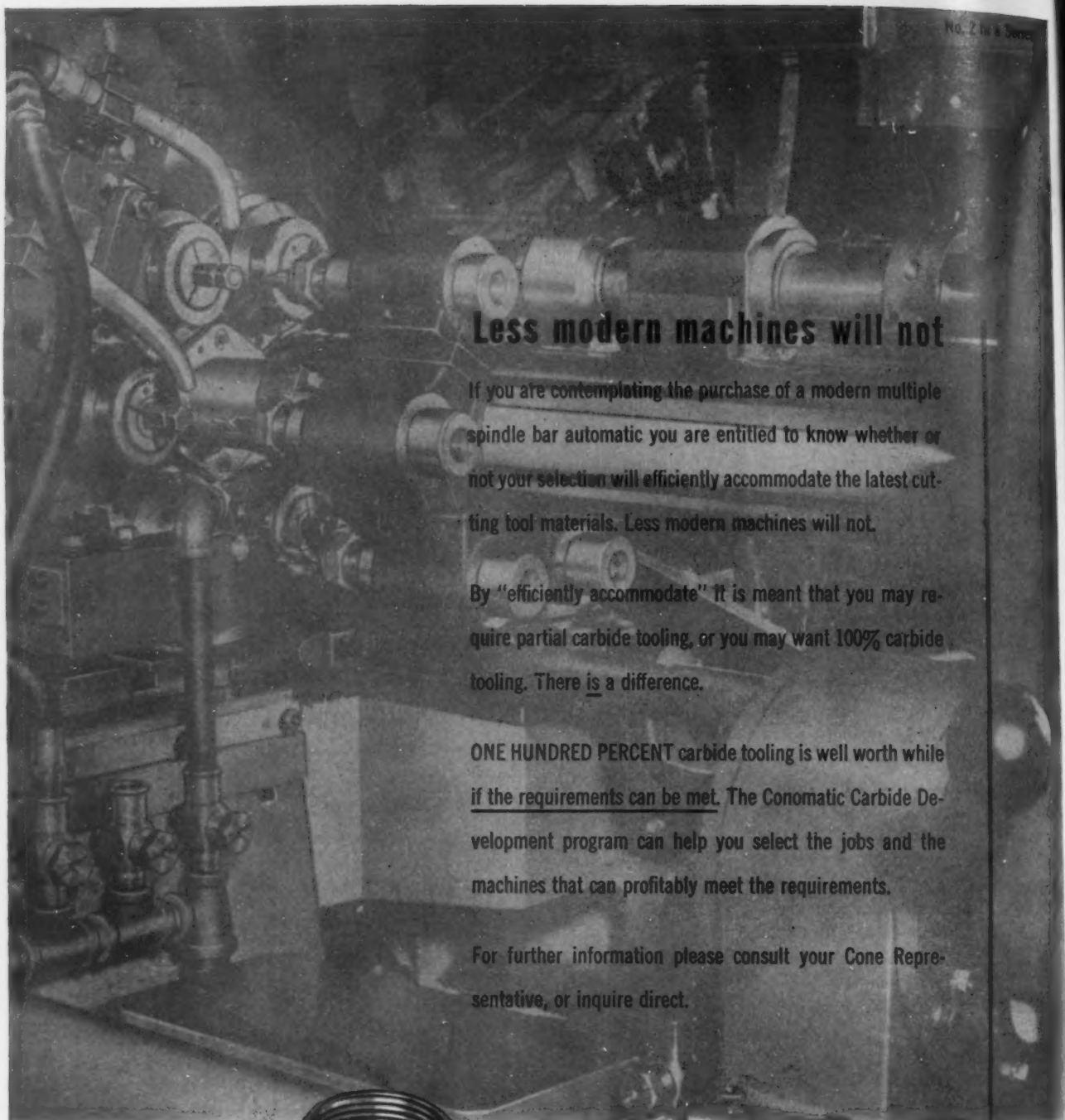
At a meeting of the American Society of Tool Engineers in Indianapolis, the NMTBA spokesman told the group that more than 20 pct of the machine tools now being used for production work are more than 20 years old.

"A machine tool built that long ago is a fossil today. . . . Machines 20 years old, for example, cannot make full use of modern cemented carbide cutting tools, which were developed in the late Thirties and which enabled the nation to meet World War II production goals with a third fewer machine tools than otherwise would have been possible," he said.

At the machine tool industry's current rate of production, Mr. Berna estimates it would take nearly 4 years' output merely to replace all the obsolete machine tools now in the U. S.

Obsolescence a Threat . . . "Notwithstanding some recently completed plants that are magnificently equipped, the greatest threat to survival and success in the nation today is a reliance upon obsolete machine tool equipment which is not worth the floor space it occupies . . .," he added.

The NMTBA general manager also warned that Germany, which was able through American aid to replace machinery taken from it after the war, now has a well-tooled industry. "These industries will be serious competitors to American mass production industries for the years ahead," he declared.



Less modern machines will not

If you are contemplating the purchase of a modern multiple spindle bar automatic you are entitled to know whether or not your selection will efficiently accommodate the latest cutting tool materials. Less modern machines will not.

By "efficiently accommodate" it is meant that you may require partial carbide tooling, or you may want 100% carbide tooling. There is a difference.

ONE HUNDRED PERCENT carbide tooling is well worth while if the requirements can be met. The Conomatic Carbide Development program can help you select the jobs and the machines that can profitably meet the requirements.

For further information please consult your Cone Representative, or inquire direct.



MATERIAL—1040 STEEL

	HSS	CARBIDE
Cycle Time	*	30 secs.
Work Spindle Speed	*	670 R. P. M. at 160 S. F.
Tool Wear	*	2000 pcs. per grind

*Hot rolled material prevents fair comparison



Conomatic }

CONE AUTOMATIC
MACHINE COMPANY, INC.
WINDSOR, VT., U.S.A.

REPORT TO MANAGEMENT..

No one feels jittery—yet

The downcurve is just perceptible, unnerves no one, but more definitely the economy is passing into moderation from boom. Still clinging stubbornly to record levels, production and employment nevertheless are inching down or failing to register usual seasonal gains. Important economic indicators show a softening trend that may accelerate slightly and carry us more fully into less boom for 1954.

Output index eases down

Clocking the pace of production, Federal Reserve Board's index for October held to the September rate of 232, a 2 pct decline from August's 234. Now, it seems clear that August was the turning point of the boom. If you're seeking consolation, remember the October output rate in '53 was still 1 pct above 1952. September production breakdown shows manufacturing as a whole slipping to 243 against 247 for August. With durable goods more susceptible to slide-off, their rate eased from 309 in August to 303 in September. Nondurables, roughly holding to 1952 output rates, declined from 198 to 195.

Buying zeal curbed a bit

Minor dips in the workweek, department store sales, a suspiciously small hike of the consumer installment debt may indicate buying zeal is retreating a whit. In September '52 manufacturing workers averaged 41.2 hours per week in a workweek rich in overtime. Notched down all year long, the workweek now stands at about 39.6 hours. A sensitive indicator of the boom's deceleration, the workweek's shortening may prelude mild cuts in employment next year. Since labor is industry's highest fixed cost, firms will bear down hard in trimming the payroll, workweek as demand dictates.

Hope for heavy buying

Department stores hope the Christmas spirit will be a buying spirit. They need a lift to offset declining sales rates of recent weeks. October sales should be about 5 pct below 1952. September failed to register fall resurgence of department store buying. For the week ending Oct. 27 sales were 7 pct under 1952 and for the week ending Oct. 17, 5 pct less.

Installment debt slows climb

In September 1952 the consumer installment debt leaped \$319 million. This September saw the debt rise by only \$116 million to reach about \$21.2 billion. Lower for the month than in the past 3 years, the September debt climb was half that of August. Fix the blame on recession talk, high indebtedness that discourages further mortgaging of future income, mounting loan caution by banks, and a slightly waning buying enthusiasm. Autos have eaten a good chunk of their cake. They account for over \$10 billion of the installment debt.

Savings backstop any debt decline

Will the peak consumer installment debt come crashing down about our ears? Hardly. With personal income running about \$287 billion (a gnat's hair below August), the installment debt does not yet pose a hazard. It can only do so if personal income veers downward too steeply. Because September income was towering, it can be assumed that the short debt rise reflected some consumer postponement of buying rather than lack of funds. Safety cushion for any further drop in consumer installment spending is thickly upholstered by record consumer savings. For the first 9 months of '53 deposits in the 528 mutual savings banks were a peak \$24 billion, running 8 pct above the rate of 1952's increase.

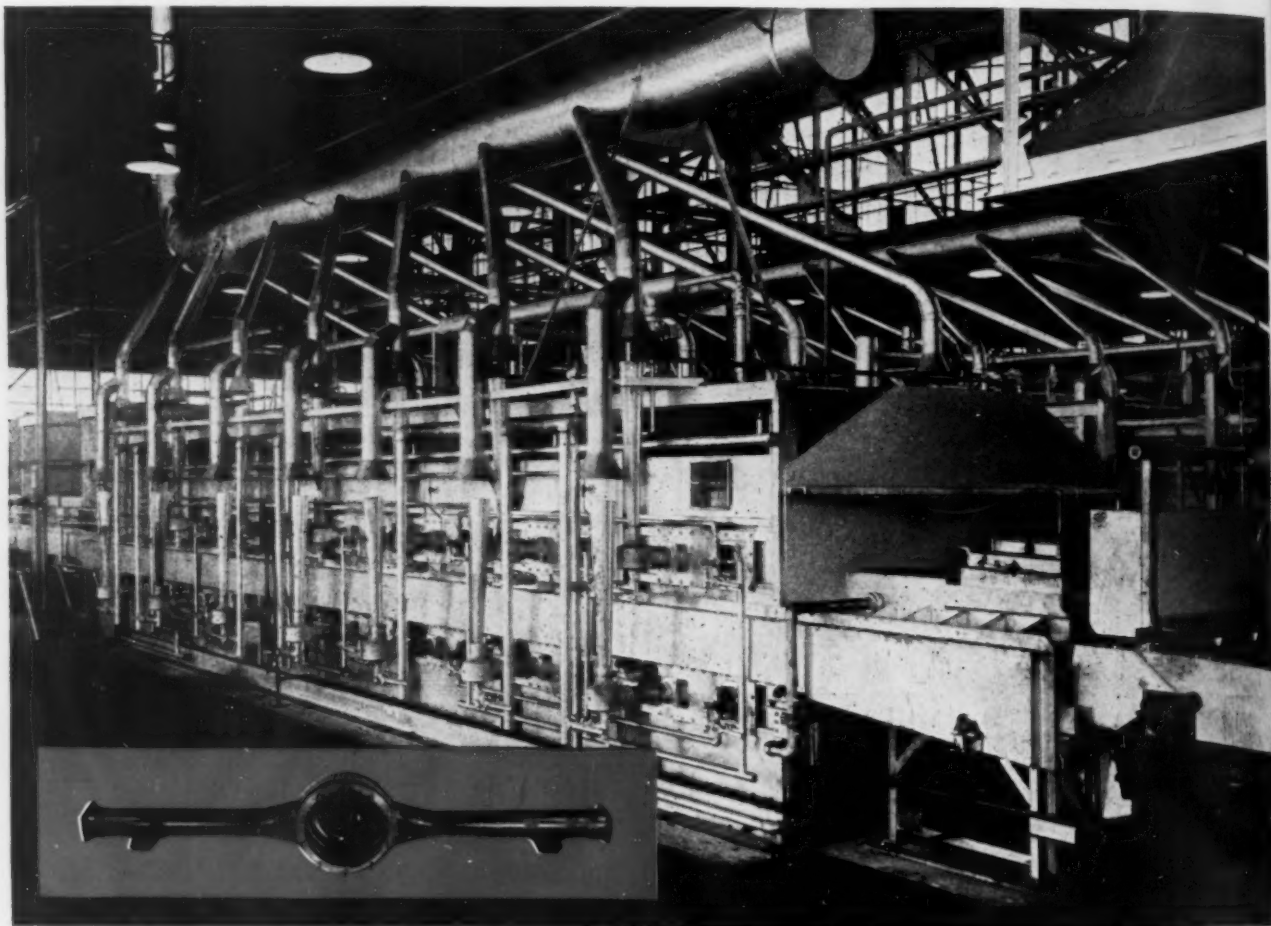
at five tons per hour

Ford Motor Company makes rear axle housings from welded steel tubing. Deformation in forming operations is so severe that the tubing must be clean annealed.

Two 'Surface' Roller Hearth Continuous Furnaces do the job for Ford at a rate of five tons of tubing per hour, per furnace. Radiant tube heating plus a 'Surface' controlled atmosphere (DX gas) prevents oxidation, eliminates the necessity of a pickling operation.

Shown below is the charge end of one of the 'Surface' Roller Hearth Continuous Furnaces. They are key components in this highly integrated production line that automatically cuts, forms, welds and anneals, rear axle housing tubes from coiled strip stock.

**roller hearth furnace
anneals steel tubing
to take "the bends"**



In more than a quarter century of use, 'Surface' Roller Hearths have demonstrated remarkable versatility in heat treatments on tubing, bars, coils, discs, sheets, both ferrous and non-ferrous—carbon restoration, heating for forming, annealing, high-speed stress relieving, hardening and drawing. They use direct firing, convection heating, or radiant tube indirect heating, all incorporating gas-saving, automatic proportioning burner equipment. Take advantage of 'Surface' experience and versatility to boost your production and profits.

Write for 'Surface' Literature Group H-53-3.



SURFACE COMBUSTION CORPORATION • TOLEDO 1, OHIO

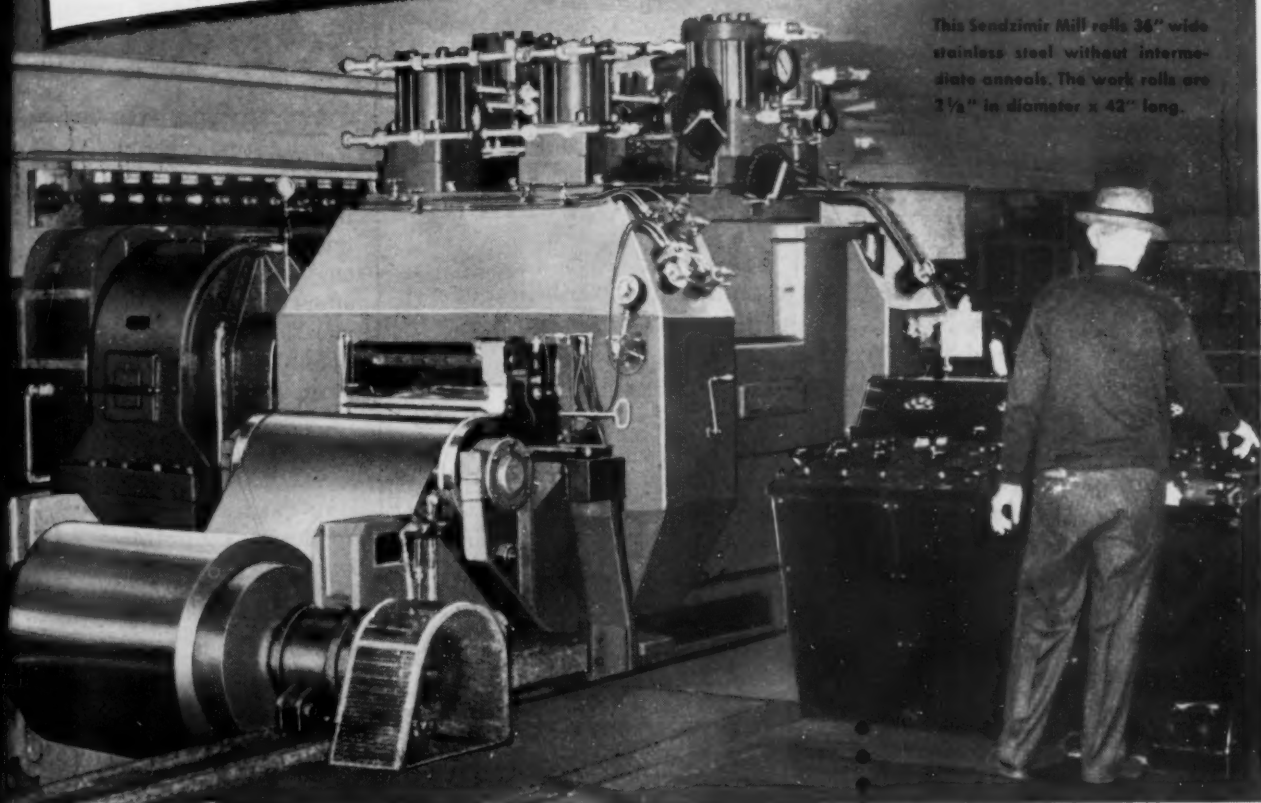
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WILL REDUCE YOUR
COLD ROLLING COSTS,
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This Sendzimir Mill rolls 36" wide stainless steel without intermediate anneals. The work rolls are 3 1/2" in diameter x 42" long.



Sendzimir Reversing Cold Strip Mills Roll Wide, Work-Hardening Strip To Precise Gauge Without Intermediate Annealing

A unique roll arrangement enables a Sendzimir mill to reduce work-hardening metals like stainless steel 90 and 95% without annealing.

The roll separating force is transmitted directly to a one piece steel housing through intermediate rolls and caster type backing shafts. This highly rigid design makes possible the use of small diameter, indirectly driven work rolls which have extra reducing ability.

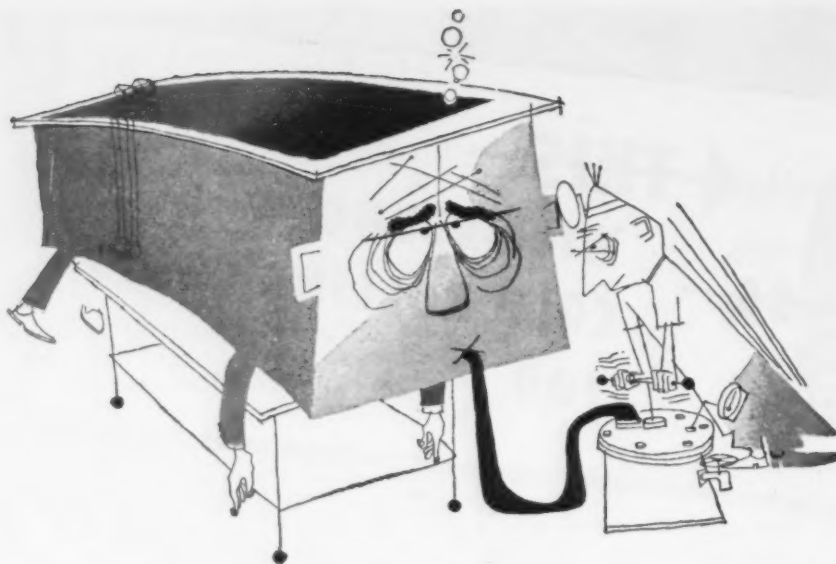
Write, wire or phone for further details

Armzen Company

WATERBURY 64, CONN.

OTHER SENDZIMIR MILL ADVANTAGES

- ★ No limitation as to width of strip
- ★ Rigid backing gives the mill extra ability to maintain close tolerances — an advantage on both ferrous and non-ferrous strip
- ★ Elimination of intermediate anneals also saves handling, reduces inventory and provides a better surface finish
- ★ Compact mill design requires less floor space
- ★ Small working parts make maintenance quick and easy — work rolls can be changed by hand in less than a minute
- ★ Requires smaller investment than conventional mills



has **coil-itis*** cramped
your production flow?

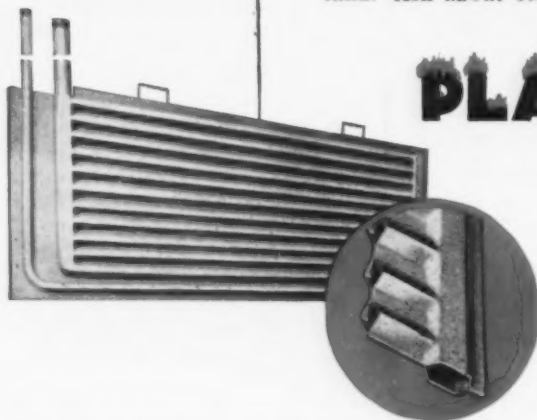
It's a waste of costly time to pump out the solution every time your process heating and cooling tanks get indigestion due to pipe coil troubles. You can save this cost and eliminate production bottlenecks by replacing the pipe coils with Platecoils. Platecoils can be removed and replaced **without dumping the solution**. They simplify maintenance and save hours of downtime. They heat or cool 50% faster and take 50% less space in the tank. As revolutionary as the new wonder drugs, Platecoils cure production troubles involving heat transfer . . . and give profits a shot in the arm.

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At Continental Motors Corp., 3 crankcase sections can be cleaned at one time when Platecoils are used while only one crank case can be cleaned with pipecoils in the tank. Ask about other case histories.



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REPLACES PIPE COILS

Coil-itis — Diagnosed as tank heating and cooling problems. **Platecoils** — the prescription for solving pipe coil problems.

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Free Publications

Continued

Steam generators

Diversified line of Union steam generators and allied equipment covered in new 20-p. condensate catalog circulated by Union Iron Works. Eight basic arrangements of 2, 3 and 4 drum steam generators furnished to meet wide range of loads, pressures and temperatures for power, process and space heating are described. Also included are heat recovery units, plain tube and cast iron extended surface economizers and Union process equipment. *Union Iron Works.*

For free copy circle No. 13 on postcard, p. 14

Ferromagnetic cores

Featured in new bulletin released by Stackpole Carbon Co. is 16-p. insert containing physical and electrical characteristic graphs of various Ceramag grades. The bulletin offers engineering information, application data and dimensions of Ceramag Ferromagnetic Cores. Most popular standard types of Ceramag described range from tin cup cores and cylindrical cores to cores for transformers and splitting ring quadrants for deflection yoke applications. *Electronic Component Div., Stackpole Carbon Co.*

For free copy circle No. 14 on postcard, p. 14

Gear chucks

New brochure available from Garrison Machine Works gives illustrations and details of company's custom-built gear chucks. Included in the text are service, facilities, some typical gears finished with precision Garrison gear chucks, gear gages and some typical installations of gear chucks. *Garrison Machine Works, Inc.*

For free copy circle No. 15 on postcard, p. 14

Carbide material

Anyone interested in tungsten carbide components will benefit from *Sinterforge Tungsten Carbide Components*, new booklet released by Sintercast Corp. of America. Illustrations of components ranging from pieces as small as 1/2 g to those weighing as much as 18 lb show the variety of shapes, sizes and forms made by company. *Sintercast Corp. of America.*

For free copy circle No. 16 on postcard, p. 14



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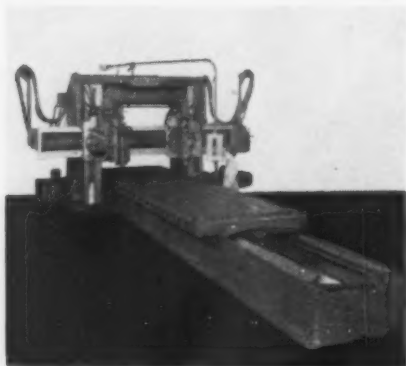


NIKOH TUBE COMPANY 5000 S. WHIPPLE ST. • CHICAGO 32, ILLINOIS • GROVEHILL 6-6500

November 12, 1953

NEW EQUIPMENT

New and improved production ideas, equipment, services and methods described here offer production economies . . . just fill in and mail the postcard on page 143 or 144.

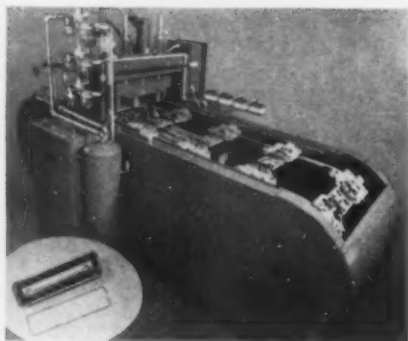


Skin milling machines feature simple control

A series of highly specialized jet aircraft skin milling machines is being delivered to the aircraft industry. The largest unit is 22 ft wide x 67 ft long. The design features two 50 hp, 3450 rpm Onsrud heads. Both rail heads swivel 20° either side of vertical. Left hand rail head has additional movement of 15° front to back either side of vertical. Instantaneous quill retrac-

tion of 1½ in. is permitted. Micrometer adjustment provides accurate repositioning of the quills. A 4-in. overall vertical adjustment of the heads is permissible. Positive gear combinations insure accurate automatic synchronization of head and table feed movements. A specialized pendant station is furnished. *G. A. Gray Co.*

For more data circle No. 17 on postcard, p. 143.

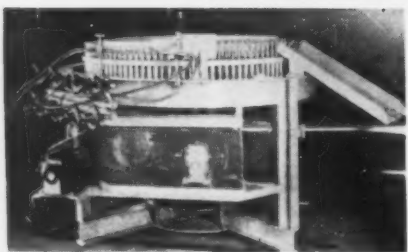


Resistance welding with built-in automation

This particular machine for welding retainers to valve gasket covers provides an application of resistance welding combined with built-in automation. Simplicity in loading makes possible a production in excess of 600 units per hr. Features include a continuous chain conveyer which carries 12 fixtures moving intermittently by means of an air cylinder. Positive location is ob-

tained by an air-operated stop pin. When a fixture comes into the welding station, an air-operated clamping cylinder exerts a force downward on the part pushing the fixture onto locating pins and the valve cover over the back-ups. Twelve spot welds are made simultaneously. *Multi-Hydromatic Welding & Mfg. Co.*

For more data circle No. 18 on postcard, p. 143.

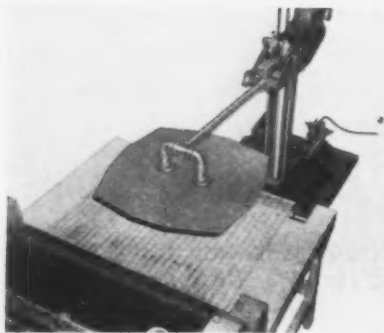


Rotary machine brazes 1000 pieces per hour

A special continuous brazing machine is used in the manufacture of faucet stems. The stems are made in two pieces: stainless steel cup that receives the rubber washer, and a brass stem. As the table rotates the cup is placed on the stem,

the stem is placed in the holder and a ring of silver solder with the flux is placed in the cup. Parts pass through oxygen and propane torches, and then under a water spray. *Waltz Furnace Co.*

For more data circle No. 19 on postcard, p. 143.



Automatic vacuum lift handles metal sheets

New vacuum lift contains its own vacuum plant and is shipped completely assembled, ready to hook into electric power and air line. It will handle any nonporous metal sheets up to 40 x 40 in.; will handle from 1 to 6 sheets per min. The machine picks up at any level from floor to 36 in. height and is adjustable through this range. It

also is adjustable through 180° turn to be able to lay the sheet exactly into position in any repetitive operation. The per cycle air consumption is approximately 60 cu ft. Pushbutton control can be put on a separate unit handy to the operator. *Union Tool Corp.*

For more data circle No. 20 on postcard, p. 143.

Turn Page

New BLISS

HYDRO-DYNAMIC PRESS

helps Ford form 1000 different wing parts

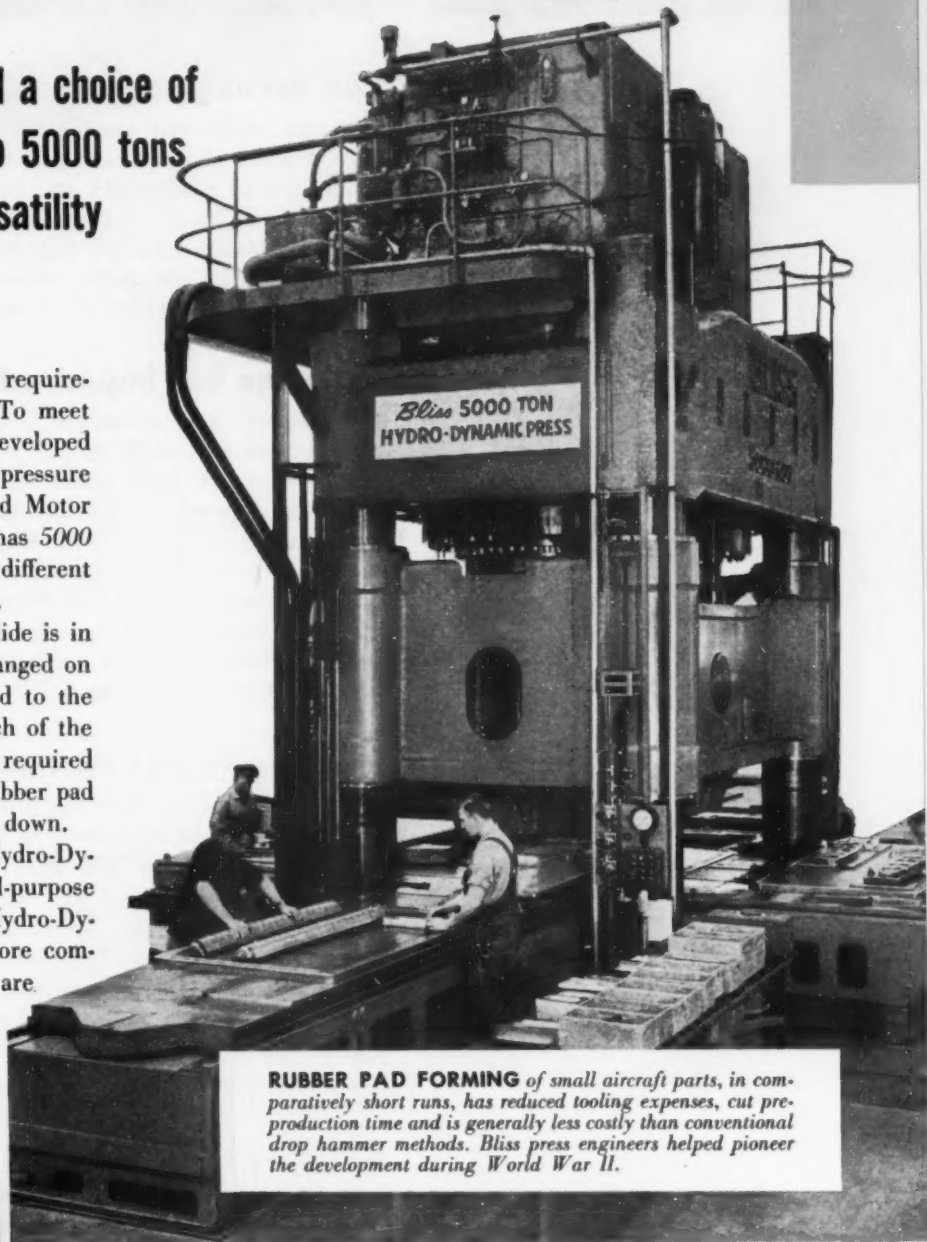
Four die slides and a choice of
any pressure up to 5000 tons
give short run versatility

High pressures and short runs are typical requirements of modern aircraft production. To meet these needs during World War II, Bliss developed special rubber pad forming presses. Now pressure requirements are higher still. The Ford Motor Company's new Hydro-Dynamic press has 5000 tons capacity. And it produces over 1000 different wing parts at Ford's Kansas City plant.

Here's how it works: While one die slide is in the press, blanks are set up or dies changed on the other three. Slides can then be fed to the press in any sequence; operators at each of the die slide tables can select any pressure required up to 5000 tons; and, of course, the rubber pad forming techniques keep tooling costs down.

Like this Ford installation, many Hydro-Dynamic presses are engineered for special-purpose use. But also available are standard Hydro-Dynamic presses designed to meet the more common production problems. Both types are described in Catalog 30-A which is yours for the asking.

Simply write or wire address below.



RUBBER PAD FORMING of small aircraft parts, in comparatively short runs, has reduced tooling expenses, cut pre-production time and is generally less costly than conventional drop hammer methods. Bliss press engineers helped pioneer the development during World War II.

BLISS

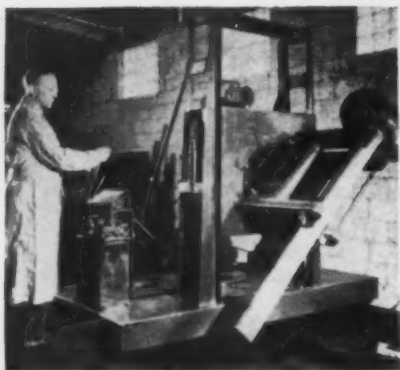
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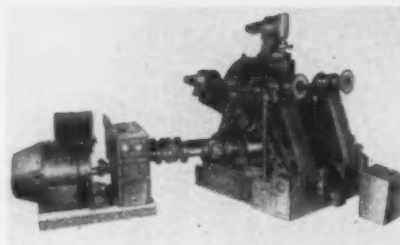


Manipulator removes hot forgings from furnace

To reduce hazards and to increase speed of removing large forgings from a hardening furnace and lowering them into a quench tank, a special electric-hydraulic manipulator can be built as a part of heat treating furnace installations. The manipulator illustrated was designed to remove a 1000-lb forging from a hardening furnace at 1600°F, rotate it 90°, then lower

it into the quench tank. The entire cycle is completed in 10 to 15 sec. The machine rides on a pair of rails. Its hydraulically actuated grabs maintain a strong, positive hold on the forging so that it may be turned 360° in either direction or raised or lowered 48 in. Operator rides on platform; observes every operation. *Grand Specialties Co.*

For more data circle No. 21 on postcard, p. 141.

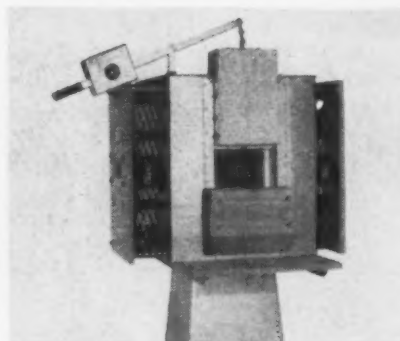


Roll arrangement assures accurate straightening

Accurate end-to-end straightening is assured by the advanced roll arrangement in a new tube and bar straightener. Listed as the 4 KTC, the straightener employs Sutton's seven-roll principle with cluster roll arrangement, which positively

confines work to the pass line without guides. Designed for 3½ to 12-in. OD tubes and bars from 3½ to 7½ in. diam, the straightener may be modified for particularized needs. *Sutton Engineering Co.*

For more data circle No. 22 on postcard, p. 141.



Redesign has improved performance, stability

Redesigning has enhanced both performance and stability of the Sentry Model Y high speed steel hardening furnace. A heavy welded plate base provides greater floor support. Other improvements include close regulation of heat at the operating range, rapid heating to desired temperature and generally greater operating economy. Silicon

carbide resistors located above and below the one piece silicon carbide muffle chamber supply the heat. Furnace door is a monolithic refractory unit which raises and lowers in a precise path in guides. Heating elements and terminals are readily accessible on each side of furnace. *Sentry Co.*

For more data circle No. 23 on postcard, p. 141.

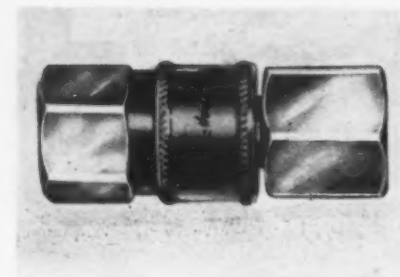


Platform trucks feature hydraulic lift mechanism

A redesigned high lift platform truck of the stand up rider type is available in 2000, 3000 and 4000 lb capacities. A variety of platform sizes handle different types of loads. Single lift and telescoping models are available. The hydraulically operated lift mechanism is powered by a separate electric motor which permits the operator to

raise or lower his load while the truck is in motion. Magnetic controller provides four running speeds in either direction. Speed of lift is remarkably high and operator's visibility is extremely good. Compactness, maneuverability and light weight are incorporated in this truck. *Wright-Hibbard Industrial Electric Truck Co.*

For more data circle No. 24 on postcard, p. 141.



Quick couplers feature greater flow, light weight

New principles of valve construction and sealing incorporated in the Hi Flow line of quick connect-disconnect couplings permit manufacture of a coupling that produces more flow, is 50 pct lighter and 30 pct smaller than previous models. Simple construction permits

easy accessibility and rapid repair in the field. Full swivel action prevents hose kinks. For special applications, Snap-Tite couplings can be made from almost any machineable metal. *Snap-Tite Inc.*

For more data circle No. 25 on postcard, p. 141.

Turn Page

CONTINENTAL'S PROOF BOOK



RAY YERGER

Purchasing Agent for the John E. Sjöström Co. of Philadelphia for twenty-four years. Formerly associated with William P. Walters Sons.



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25 September 1953
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New Bedford
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Gentlemen:-

The salesman's magic words, 'increase production... improve efficiency... and reduce costs', always alert us--but not always does his product back them up.

Your local representative, Dean Skillin, used the words when he introduced your Hy-Pro Phillips Insert Bits to our Production Manager... and without exaggeration.

We think you should know that extensive tests on our assembly line tend to prove that Continental's Holtite Phillips Screws driven by Hy-Pro Holders and Bits are a perfectly matched fastening combination that has saved us countless dollars!

Assuming that your service and quality will remain constant, the John E. Sjöström Company will continue to "Count on Continental" as you so appropriately advertise, for many years to come.

Very truly yours,

Ray Yerger
Ray Yerger
Purchasing Agent

You too can count on Continental®



Manufacturers of HOLTITE Fastenings For Every Purpose

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TYPE 304				
31	3/16	84/98	190/290	
30	1/4	90/98	210/290	
4	5/32	71/97	123/270	
12	5/16	71/98	123/270	
13	3/8	80/98	195/255	
3	7/16	90/98	190/240	
23	1/2	83/98	190/240	
7	5/8	76/98	200/250	
2	11/16	72/98	220/250	
2	3/4	68/98	180/225	
2	13/16	77/98	170/225	
4	7/8	72/85	180/240	
2	15/16	76/85	200/240	
1	1	72/90	190/190	
1	1-1/8	69/84	120/180	
1	1-1/4	60/84	120/180	
2	1-1/2	54/74	120/140	
TYPE 304 L				
28	3/16	84/98	190/290	
23	1/4	90/98	210/290	
2	5/32	71/97	123/270	
11	5/16	71/98	123/270	
13	3/8	80/98	195/255	
1	7/16	90/98	190/240	
10	1/2	83/98	220/250	
0	5/8	76/98	200/250	
1	11/16	72/98	180/225	
5	3/4	68/98	170/225	
1	13/16	77/98	180/240	
1	7/8	72/85	190/240	
1	15/16	76/85	200/240	
4	1	72/90	190/190	
1	1-1/8	69/84	120/180	
1	1-1/4	60/84	120/180	
2	1-1/2	54/74	120/140	

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BUYERS OF STAINLESS PLATE have always found Carlson Weekly Stock Lists important. These lists tell them what they want to know about the size, gauge and type of stainless plate in stock at G. O. Carlson, Inc. Some time ago publication of these valuable lists had to be stopped... but now they are again available!

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We will be glad to send you these weekly Stock Lists as a reminder of what's available at G. O. Carlson, Inc. A note from you will "do the trick".

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 District Sales Offices in Principal Cities

New Equipment

Continued

Vapor collector

Paddle wheel fans are now employed in the Model VCM-2 vapor collector to cope with sludge as well as mists from finish contour grinding of jet engine blades with abrasive cloth. The fan successfully resists the tendency of the sludge-like material to load up and provides an increase in the



total cfm capacity of the collector. A 3/4 hp motor is standard equipment. An increase of 5 1/2 in. in overall height does not interfere with installations of the collectors since they are invariably installed overhead so the collected coolant can return, by gravity, in the form of condensate to the reservoir of the machine for re-use. Agat-Detroit Co.

For more data circle No. 26 on postcard, p. 143.

Fine grain X ray film

New ultra-fine grain industrial X ray film can be used at low voltages to examine low-capacity materials such as aluminum and magnesium. With million-volt X ray or betatron equipment, it may be used to examine steel up to 3 in. in thickness. The film can be used to particular advantage on subjects where very minute detail is desired; the fine grain emulsion permits detection of tiny flaws in, for example, spotwelding in aluminum sheeting. E. I. du Pont de Nemours & Co.

For more data circle No. 27 on postcard, p. 143.

Turn Page



Lightweight **HELIARC** torch
Trade-Mark

is **WATER-COOLED**
for Efficient inert gas welding
at **LOW COST**

You can make high quality welds, quickly and easily, in stainless, aluminum, cast iron, HASTELLOY and MULTIMET alloys—practically all commercial metals—at lower cost with the 300 amp. HELIARC HW-10 water-cooled torch.

You'll find that the improved water-cooling system assures cooler and more effective operation even when the torch is used continuously at the full rated capacity. The cooling water flows through the power cable and torch body down to the water jacket and gas cup. The return flow follows the same route in reverse. All exterior "plumbing" has been eliminated allowing more maneuverability and preventing leakage due to accidental damage. Water-cooling makes lightweight torch construction possible, and because the power cable is also water-cooled, it too, is lightweight and easy to handle.

"Heliarc," "Hastelloy," "Linde," and "Multimet" are registered trade-marks of Union Carbide and Carbon Corporation.

The HW-10 was designed so that the water passages are accessible and easily cleaned.

Electrodes are easily adjusted on the HW-10. A quarter turn of the torch cap releases the electrode for adjustment or replacement. You need no wrenches or other tools. In addition, electrode stub loss is reduced by placing the water-cooled electrode holder much closer to the arc.

Are you getting the best possible results from your present welding apparatus? Developments in the inert gas welding field have been so great and have come so rapidly that torches over four or five years old are now obsolete. Be sure that you have the highest production at the lowest cost. Modernize with the 300 amp. HELIARC welding torch.

Your local LINDE representative would be happy to give you more detailed information on the HELIARC HW-10.

LINDE AIR PRODUCTS COMPANY

A Division of Union Carbide and Carbon Corporation

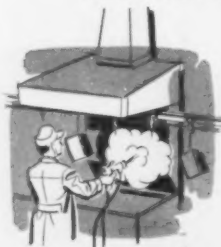
General Office: **UCC** New York 17, N.Y.

In Canada: DOMINION OXYGEN COMPANY, LIMITED, Toronto



WANT TO LOWER YOUR PAINTING COSTS?

...and get a better paint job, too?
Check the RANSBURG Processes!



Let's say you're a manufacturer of some painted product. Size and shape aren't too important. You're already using a conveyorized set-up, but you want a better quality finish . . . increased production . . . at less cost.

You've heard about electrostatic spray and some of the phenomenal results being achieved by Ransburg on other production lines. You write or call . . . say you want to know what Electro-Spray painting can do for YOU.



Ransburg engineers will help you investigate the possibilities. They'll gather complete data on your present operation, and check your facilities and requirements. If Electro-Spray is feasible, you will send samples of your unpainted products—with paint—to the Ransburg laboratories in Indianapolis. The labs are completely equipped, and the Ransburg engineers and technicians have every facility at their disposal for conducting extensive tests, simulating your production conditions.

After the preliminary studies and tests, you are invited to see your job run in the Ransburg Labs. There's no guesswork. You'll see the actual results. Paint and labor savings are determined. You can check the improved, uniform quality, and you'll be furnished drawings, showing the proposed installation for your own plant.



ALL OF THIS WITHOUT OBLIGATION TO YOU!



After the Electro-Spray equipment is installed, Ransburg will continue to work with your finishing department. Ransburg engineers—men skilled in electrostatic spray painting—are always available to work with you on any problem which might arise in your finishing department. Fair enough? Let us hear from you.



Ransburg **ELECTRO-COATING CORP.**

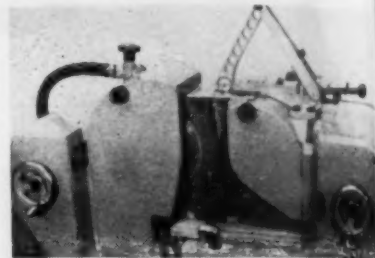
INDIANAPOLIS 7, INDIANA

— New Equipment —

Continued

Centerless grinder

The Herminghausen standard centerless grinder has been adapted for production grinding of rotors and rotor shafts for small electric motors. The rotors together with their shafts are introduced into the centerless grinder by means of a feed arm. The grinding wheel and the feed wheel are split. One part of the grinding wheel grinds

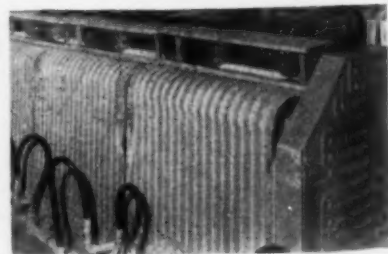


the cylindrical portion of the shaft; the other part, dressed with a step, grinds the pointed end of the shaft. The axis of grinding wheel and feed wheel are set parallel. Maximum capacity of the SR30 is 1 1/4 in. diam; overall shaft length, 4 in. Three different types of the centerless grinders are manufactured. All machines are available for infeed or throughfeed. *Eric R. Bachmann Co.*

For more data circle No. 28 on postcard, p. 143.

Plate coils

Thermo-panel plate coils are said to be an effective substitute for pipe coils in tank heating and cooling, eliminating need for expensive pipe coiling. They provide efficient



heat transfer and are available in special shapes and in a wide range of materials including stainless steel, Monel and other special alloys. *Dean Products, Inc.*

For more data circle No. 29 on postcard, p. 143.

Turn Page



Start with welded tubing...
fabricate to your design

● There's practically no limit to the design requirements you can meet with Brainard Welded Steel Tubing. You can upset, swage, spin, flange, flatten, taper, or otherwise cold form it. It's an economical structural material—and pound for pound carries more load than any other shape.

Investigate the advantages of Brainard Welded Steel Tubing for your products. Write Brainard Steel Division, Dept. O-11, Griswold Street, Warren, Ohio. An integrated producer; offices throughout the U. S.



Upsetting is a simple operation. Uniform strength of Brainard Tubing is maintained in severe cold form operations.



WELDED STEEL TUBING



ENDWELDUR SLING CHAINS



Small AMERICAN Sling Chain Lifts 25,000-lb Load Safely

• This ACCO Registered 4-leg, Endweldur 125 Sling Chain is relatively light in weight yet it has sufficient strength to lift an expensive 25,000-lb die with safety.

This desirable combination of great strength and light weight is the result of scientific heat-treatment of the alloy steel used in this modern chain and the proper combination of engineered hooks and pear shaped links that make up a complete ACCO Registered Sling Chain assembly. This gives you a chain that is easy to handle and safe to use even where working temperatures run up to 1000°F.

Endweldur 125 ACCALLOY Sling Chains come in sizes from 1/4" to 1 1/4" with working load limits to 57,500 lbs per leg, so there is a size for just about every lift you have. Other AMERICAN Sling Chains are available in Endweldur 85 made of carbon steel, heat-treated . . . also stainless steel, monel metal and silicon bronze . . . and wrought iron.

AMERICAN has a sling chain for your every need.
See your distributor or write our York, Pa. office today
for the ACCO Registered Sling Chain Catalog.

ACCO



AMERICAN CHAIN DIVISION
AMERICAN CHAIN & CABLE

York, Pa., Atlanta, Chicago, Denver, Detroit, Los Angeles,
New York, Philadelphia, Pittsburgh, Portland,
San Francisco, Bridgeport, Conn.

**American
Chain**

New Equipment

Continued

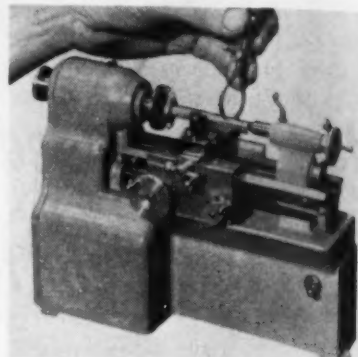
Tapping fluid

A dynatonic metal-cutting fluid for difficult tapping and threading operations is said to give low rupture energy advantages to tapping and threading. Less force is required to produce threads, making it easier while reducing tap breakage. Tapeze will satisfactorily tap stainless steel, titanium, and other types of steel generally considered to be non-machinable. Tapeze may be applied straight, by hand, using a pressure-type oil can or paint brush. *Metalloid Corp.*

For more data circle No. 39 on postcard, p. 143.

Machinist's lathe

A portable precision metal cutting lathe has been designed for machinists requiring a small, inexpensive lathe for metal, wood and plastics. It measures 10 1/2 in. long, 3 3/4 in. wide x 7 1/4 in. high and weighs less than 12 lb. Built-in 110 v ac



fan cooled motor, mounted in base, has 6-ft cord, and switch. Lathe is built of steel, cast iron and aluminum alloy parts with steel and brass gears. It takes work up to 4 in. long between centers, has 3-in. swing and 1/8 in. collet capacity. Lathe comes complete, ready to use. *MasterSon Engineering Co.*

For more data circle No. 31 on postcard, p. 143.

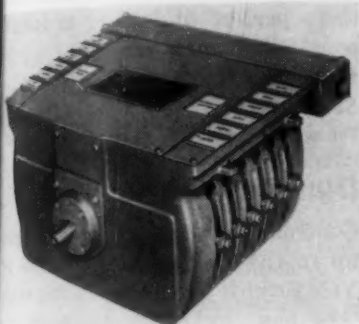
Bit gage

A new bit gage, No. 47, is fully adjustable, will not mar surface of work, and has no parts to lose. Clamp is quickly attached to the shank of any auger bit 3/16 to 16/16 in. sizes. Spring is then adjusted for correct depth of hole desired. *Stanley Tools.*

For more data circle No. 32 on postcard, p. 143.

Limit switch

Developed to meet the specific needs of mechanical press automation devices, a new rotary cam limit switch features external adjustment during operation of the press; permits split second timing. This provision simplifies the synchronizing to the press cycle of independently powered press auxiliaries since the press can be stroked while individ-



ual switches are being adjusted. Adjustment is by setting a thumb-screw. Double break snap switches are used for added safety and to permit more accurate timing at the moment of contact. Circuits may be wired so that the make and break can be timed independently. Two sizes of rotary cam limit switches have up to 12 or 22 cams respectively. *Danly Machine Specialties, Inc.*

For more data circle No. 33 on postcard, p. 143.

Honing tool and stone

Principal feature of a new line of general purpose honing tools and honing stones is the quick clamp stone holder. This accommodates the Barnesdril Plas-T-Clad abrasive with interchangeable oversize hold-



ers to vary the diameter that can be honed with each tool body. Abrasive sticks have had protective material added to the sides. Clamp arrangement permits quick changing stones. End thrust is taken by the holder. *Barnes Drill Co.*

For more data circle No. 34 on postcard, p. 143.

Turn Page



ACCO
products

featuring
DUALOC*

With these Parts

YOU

can assemble

ACCO Registered

Wire Rope Slings

for 85% of your

lifting requirements



*Trade Mark. Patent No. 2463199.
DUALOC means dual lock. Two steel collars securely swaged around the ending double your security. Don't distort rope. Give full rope strength. Warranted by ACCO.

• Now you can buy ACCO *Registered* standard stock parts from which you can make infinite combinations of wire rope slings. If a new lifting job develops, you most likely can handle it with a different hook-up of the same standard ACCO *Registered* parts you use for regular lifts. But if you should need longer legs, or heavier legs, that's no problem either because everything you need is . . .

Stocked by Distributors

• ACCO *Registered* Wire Rope Slings and Fittings are stocked by ACCO Sling distributors. That means you can get quick service if you need additional parts, or if some part should become damaged. In case of damage, you don't send a "special" sling back for repairs. (You know how long that takes.) You just order a replacement part from your distributor who delivers promptly.

ACCO offers you a complete line of links, safety shackles, and hooks. These items are all *Registered* and *Warranted* to have the same strength and dependability as the slings they are to be used with.

Find Out Now what you can do with
ACCO *Registered* Wire Rope Slings. See your
ACCO Sling distributor or write our
Wilkes-Barre, Pa., office for literature.

ACCO

In Canada: Dominion Chain Co. Ltd.
Niagara Falls, Ontario



WIRE ROPE SLING DEPARTMENT
AMERICAN CHAIN & CABLE

Wilkes-Barre, Pa., Chicago, Denver, Houston, Los Angeles,
New York, Odessa, Tex., Philadelphia, Pittsburgh,
San Francisco, Bridgeport, Conn.





1 generalift pallet crate

replaced **6** heavy nailed crates

cut packaging costs 50%

reduced shipping costs 25%

McCord Corporation, Plymouth, Indiana, solved both a packaging and a materials handling problem with the Generalift Pallet Crate shown above. Conferences with General Packaging and Sales Engineers produced a crate which held 24 radiators, packed easily, and could be handled by fork-lift from the shipping room all the way to assembly lines. It formerly took 24 heavy nailed crates and from 24 to 30 hours of labor to ready 96 radiators for shipment. Packing the same number in Generalift Pallet Crates takes only 4 hours.

This is only one example of the many packaging problems solved every day—at a saving—in General Box Company's two fine Industrial Packaging Laboratories. General Box packaging experts stand ready to help *you* cut packaging costs, too. Write for complete details.

Find out how other manufacturers are cutting packaging costs. Write for your free copy of "The General Box."



General Box COMPANY
★ ★ ★ ★ ★
1873 Miner St.,
Des Plaines, Ill.

Factories: Cincinnati; Danville, N. J.; Detroit, East St. Louis, Kansas City, Louisville, Milwaukee; Prescott, Ark.; Sheboygan; Winchendon, Mass.; General Box Company of Mississippi, Meridian, Miss.; Continental Box Company, Inc., Houston

ENGINEERED SHIPPING CONTAINERS FOR EVERY SHIPPING NEED

- Generalift Pallet Boxes
- Corrugated Fiber Boxes
- All-Bound Boxes
- Cleated Corrugated and Watkins-Type Boxes
- Wirebound Crates and Boxes

New Equipment

Continued

Packaged brazing rings

Preformed brazing rings are packaged on cardboard tubes or a dowel rod to speedup production brazing and eliminate waste from bent ends and tangling. This packaging method has the extra value as a positive inventory control: quantities on hand can be determined at a glance. Alloy's precision-formed rings are free of burrs and their perfect fit is said to insure equal distribution of metal for uniform heat transfer. *Alloy Ring Service, Inc.*

For more data circle No. 35 on postcard, p. 141.

Dumping device

Controlled dumping at any height up to the maximum lift range of Yale forklift trucks is possible with this new hydraulic dumping attachment. The device hydraulically raises the rear end of the box



through a hook engagement, allowing the load to be dumped from the same height as the forks are positioned. The attachment is easily installed on Yale fork trucks of all types. Lifting hook is adjustable and can be used with 11 and 15 cu ft boxes. *Yale & Towne Mfg. Co.*

For more data circle No. 36 on postcard, p. 141.

Efficient dispenser

Trouble-free mechanism has been perfected for dispensing waterless skin cleansers. A two-way feed adjustment provides a choice of amount dispensed. The spout is no-drip type. The unit is aluminum with rigid mounting bracket. A throw-away container makes filling easy. *Sugar Beet Products Co.*

For more data circle No. 37 on postcard, p. 141.

The Iron Age

SALUTES

Arthur V. Wiebel

A skilled engineer with a talent for management, he likes the South, is sure of its future potential.



NOT TOO LONG AGO management used to worry about the ability of engineers to mix with employees. The idea was that engineers are so wrapped up in figures, charts, graphs that they don't know how to handle people. This may once have been the case, though it isn't so true today.

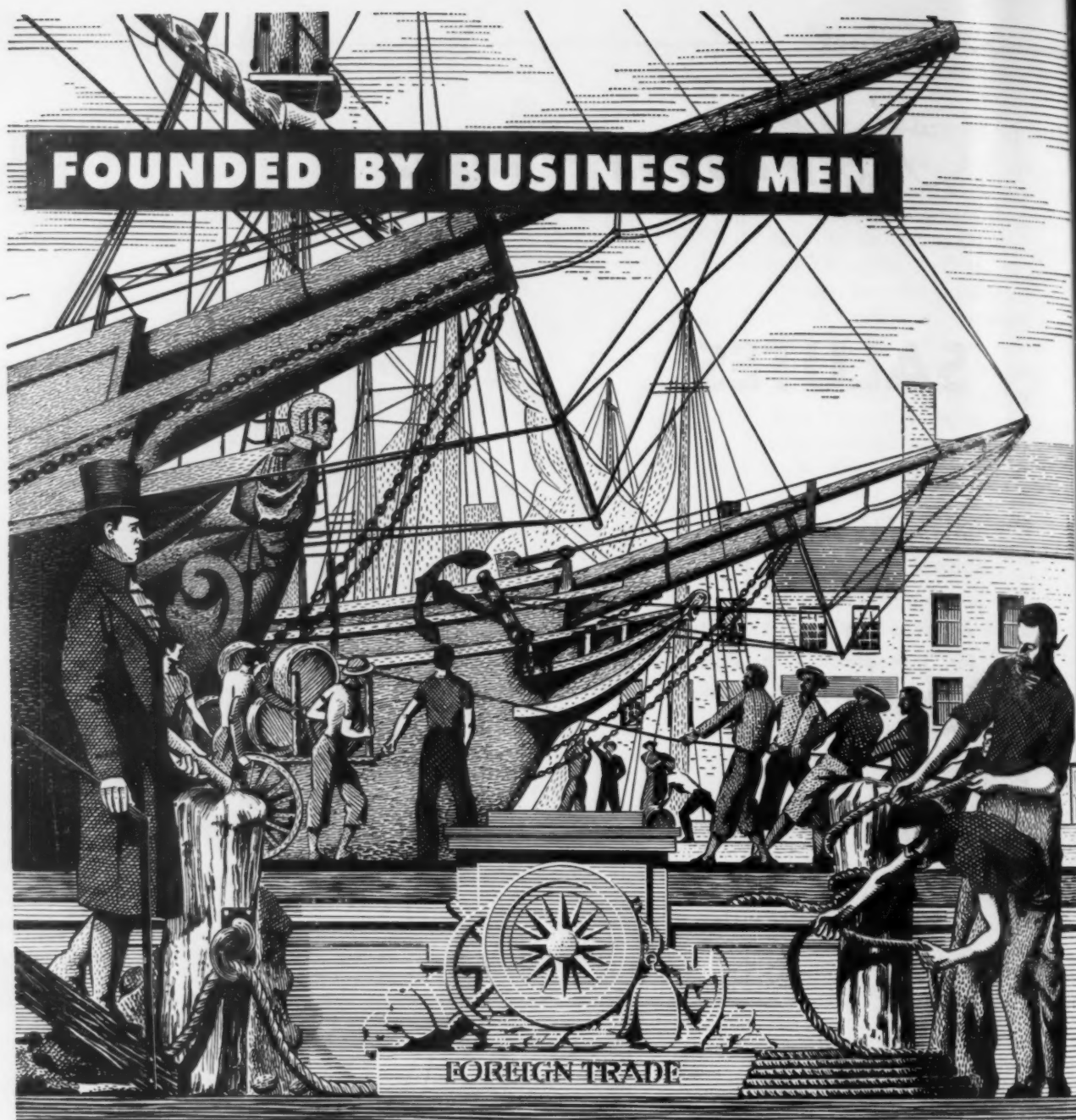
So far as Art Wiebel is concerned, it never was true. To become head of Tennessee Coal & Iron Div. of U. S. Steel, he had to show a marked talent for managing others as well as outstanding skill as an engineer.

After various jobs teaching and in industry, Art joined U. S. Steel in 1933. In the short space of 13 years, he was promoted from estimator to vice-president of TC & I. This latter post took him to Birmingham, and that's when his rabid enthusiasm for the South began.

In his search for facts on southern growth, Art has done much of his own research. He often leaves his car by the roadside and hikes through the backwoods to count television antennas, find out how many people have phones, electric ranges and other appliances. So when Art talks about the South, people listen.

President of U. S. Steel's southern arm since 1951, Art has been pushing hard to boost sales and increase the South's steel consumption. That's why he's often out of his office for weeks at a time. He works hard because he knows he has competition, but he also knows the South's potential.

Art has had little time to learn much about golf, says he isn't "old enough to take it seriously." But his neighbors say he somehow always manages to be on call when their lawnmowers, appliances or cars get out of whack.



ADAPTED FROM ONE OF A SERIES OF MURALS IN THE BANK'S MAIN OFFICE AT 48 WALL STREET

FOR BUSINESS MEN

In 169 active years a business man's bank learns how business men like to do business. This is an intangible asset that leaders of commerce and industry recognize and appreciate. Perhaps that's one reason why The Bank of New York—founded in 1784 by a group of merchants—has

today commercial accounts in each of the 48 states, and finances foreign trade in all parts of the world.

Our Commercial, Trust, and Investment Counsel Departments are always available to you, wherever

you are, or whatever your needs may be. You are invited to investigate our modern facilities, and the completeness of understanding that comes from generations of experience.

THE BANK OF NEW YORK

New York's First Bank • Founded 1784

Main Office: 48 WALL ST. ☆ Uptown Offices: 530 FIFTH AVE. ☆ MADISON AVE. AT 63rd ☆ MADISON AVE. AT 73rd
Member Federal Deposit Insurance Corporation

The Iron Age

INTRODUCES

John T. Richards, named president and chief engineer, PENN PRECISION PRODUCTS, INC., Reading, Pa.

Thomas D. Nast, made president, ALL-STATE WELDING ALLOYS CO., INC., New York.

Louis M. Venture, named president, newly formed TECH STEEL & ALLOY CORP., Chicago; Harris R. White is vice-president; and Albert Forsgaard, is office manager.

J. J. Sutherland, appointed special assistant to the vice-president and group executive, FORD MOTOR CO., Dearborn, Mich.; and K. W. Cassidy, named general manager, Steel Div.

James S. Kirkpatrick, elected vice-president, Research and Development, BROOKS & PERKINS, INC., Detroit.

Martial A. Honnell, elected a vice-president and chief engineer, MEASUREMENTS CORP., Boonton, N. J., a wholly owned subsidiary of Thomas A. Edison, Inc.

William L. Lewis, appointed vice-president in charge of purchasing, INTERNATIONAL BUSINESS MACHINES CORP., New York; and J. W. Schnackel, named general manager, Endicott plant.

Wilfred G. Schneider, elected vice-president in charge of manufacturing, THE CUNO ENGINEERING CORP., Meriden, Conn.

George R. Kloppman, elected a director, NATIONAL SCREW & MFG. CO., Calif.

Robert F. Anthony, appointed director of sales and advertising, PETERSON WINDOW CORP., Ferndale, Mich.; and E. J. La Forest, appointed plant superintendent.

Herbert Johnson, named vice-president, General Services, JONES & LAUGHLIN STEEL CORP.; Walter H. Lewis, named works manager, Pittsburgh Works Div.; and William P. Getty, becomes assistant vice-president, Production.

Dr. T. Keith Glennan, elected to the board of directors, CLEVITE CORP., Cleveland.

Harry W. Tenney, appointed administrative assistant to the vice-president, Elevator Div., Jersey City, N. J., WESTINGHOUSE ELECTRIC CORP.

Joseph P. Spang, Jr., elected a director, U. S. STEEL CORP., New York. He succeeds the late Nathan L. Miller.

Frank W. Jenks, elected a director of AMERICAN STEEL FOUNDRIES, Chicago; and Joseph B. Lanterman, elected vice-president.

Ernest E. Antus, named comptroller, ROLLED STEEL PRODUCTS CORP., Skokie, Ill.

Irwin Goodman, appointed assistant treasurer, SIPI METALS CORP., Chicago.

Carl T. Miller, appointed assistant treasurer, MACKINTOSH-HEMPHILL CO., Pittsburgh.

William H. Campbell, elected treasurer and assistant secretary, THE ELWELL-PARKER ELECTRIC CO., Cleveland.

Joseph S. Robb, appointed director of engineering in charge of all engineering functions, RADIO CONDENSER CO., Camden, N. J.

Maynard W. Johnson, appointed manager, Distribution Transformer plant, Oakland, Calif., GENERAL ELECTRIC CO.



ROBERT M. DRYSDALE, JR., elected president, Virginia Metal Products, Inc.



A. T. LAWSON, named vice-president—Production, and elected to the board of directors and the Executive Committee, Jones & Laughlin Steel Corp.



BEN F. BREGI, elected vice-president—Engineering, National Broach & Machine Co., Detroit.

Personnel

Edwin E. Caspell, appointed general superintendent, New Haven, Conn., and Trenton, N. J., plants, American Steel & Wire Div., U. S. STEEL CORP.; and John J. Grimes, Jr., named works superintendent, New Haven, Conn., plant.

E. W. Spannhake, appointed director of research and engineering, LE-TOURNEAU-WESTINGHOUSE CO., Peoria, Ill.

Paul W. Arnold, becomes manager of marketing services, RELIANCE ELECTRIC & ENGINEERING CO., Cleveland; and Charles R. Sutherland, becomes assistant chief engineer.

Burnham Adams, appointed manager-sales, field service and contract administration, Manufacturing Div., PACIFIC AIRMOTIVE CORP., Burbank, Calif.

Ansel Wiltsie, named shop superintendent, Oil Tool Div., REED ROLLER BIT CO., Houston, Tex. He succeeds Oscar Selke, who has retired.

K. J. Kettner, appointed a district manager, Cleveland-Youngstown area, THE RAMTITE CO., Chicago.

J. A. Jean, has been appointed sales manager, FRAY MACHINE TOOL SALES CORP., Glendale, Calif.

R. G. Williamson, appointed branch manager, Los Angeles district office, THE COOPER-BESSEMER CORP., Mount Vernon, Ohio.

D. A. Shardelow, appointed assistant district sales manager, Detroit Sales Office, REPUBLIC STEEL CORP., Cleveland.

Herrol W. Bellomy, appointed plant manager, Greenville plant, TEMCO AIRCRAFT CORP.; John T. Butler, promoted to assistant plant manager, Garland plant; and William A. Tweedie, named plant manager, Garland plant.

R. G. Thibaut, appointed service manager, THE THEW SHOVEL CO., Lorain, Ohio; and C. W. Raby, becomes assistant service manager.



ARLINGTON A. BRITTON, JR., elected vice-president, The Carpenter Steel Co., Reading, Pa.



H. STURGIS POTTER, elected vice-president, The Carpenter Steel Co., Reading, Pa.

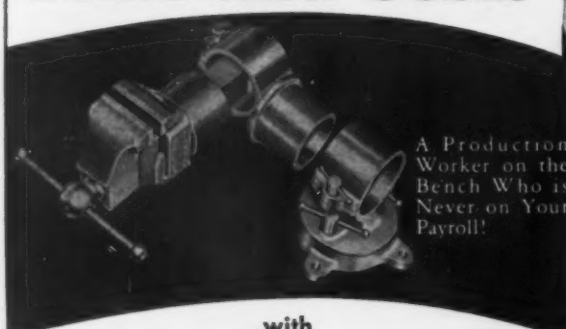


ROBERT C. MYERS, appointed director of product development, Commercial Dept., U. S. Steel Corp.



BEN SNYDER, appointed sales engineer, Dayton, Ohio, office, E. W. Bliss Co.

Cut Production Time and Costs



A Production Worker on the Bench Who is Never on Your Payroll!

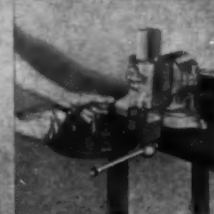
with

FLEXIVISE

A revolutionary development that saves time, labor and fatigue. Provides complete rotation of 360° in any direction. Positions work to the operator, saving time, labor and physical fatigue. Flexivise is exactly what the name implies; a flexible vise providing a greater range and greater efficiency. 4" jaw width, 5½" jaw opening. Write or wire now for complete information.

FLEXIVISE COMPANY

1149 E. Pico Blvd., Los Angeles, Calif.



Special FlexiSleeve provides a vertical rotation.



Work can be rotated a full 360° and locked in any position.



Large unwieldy pieces can be held securely by Flexivise.

He's Machining Scrap Material... at \$2.25 an Hour!



Who ever heard of machining scrap? Sounds silly on the face of it—yet countless companies admit wasting money in just this way every day: Spending hours machining and finishing parts from initially defective material—only to have them scrapped at final inspection; tying up production machines—squandering man-hours to no avail!

All this happens because of invisible cracks and defects which go undetected through stage after stage of processing, right to the end of the line!

What a needless waste! Because, with the fast,

non-destructive inspection methods developed by Magnaflux Corporation you *can know in advance* which parts or materials are defective...can unerringly separate the defectives when it costs least to salvage them or scrap them...and correct the process that causes the defect.

This is "correctioneering," by Magnaflux' methods! It is now a basic part of process control in hundreds of notably efficient plants. Write us and we'll show you how they use it... how it may save *you* money!

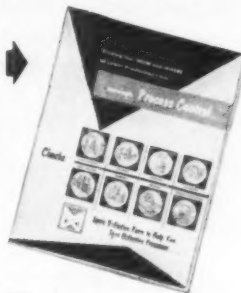
PROCESS CONTROL—through Methods by Magnaflux—

FINDS THE "HOW AND WHERE" OF LOWER PRODUCTION COSTS

- Detects defective parts or materials at a point where it costs least to reject them.
- Reveals operating trouble in processes or tools at first occurrence, so they can be corrected.
- Insures quality that is acceptable, at lowest cost per piece.



WRITE FOR THIS BROAD
COVERAGE BOOKLET NOW



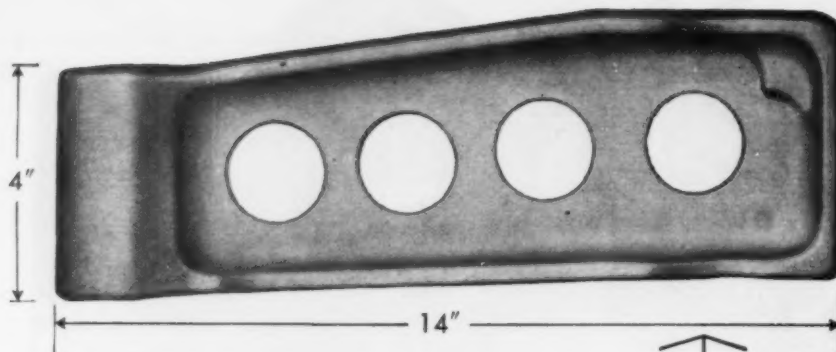
Reg. U. S. Pat. Off

MAGNAFLUX MAGNAFLUX CORPORATION

7302 W. Lawrence Avenue, Chicago 31, Illinois

New York 36 • Pittsburgh 36 • Cleveland 15 • Detroit 11 • Dallas 9 • Los Angeles 58

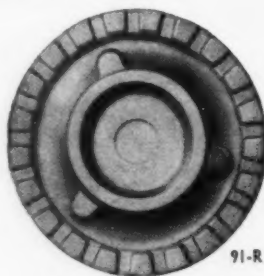




From Jet Bomber Parts
to Gas Range Burners
MUELLER BRASS CO.
Aluminum Forgings Save
Weight, Save Finishing Time
and Provide the Same
Strength as Steel

If weight and strength are important factors in your product, then Mueller Brass Co. forged aluminum parts may be your best bet. Mueller aluminum forgings weigh only $\frac{1}{3}$ as much as steel, yet they are approximately as strong. They make ideal parts for many applications and they are particularly desirable as parts for high speed rotating and oscillating machines because they reduce vibration and bearing loads, thus causing less wear on other parts. They possess good dimensional stability and retain their mechanical properties at high speeds and reasonable temperatures. The smooth, bright surfaces save machining time and eliminate costly finishing. Mueller Brass Co. can forge aluminum parts to your specifications in any practical size and shape from any of the standard or special alloys. Write us today for complete information.

MUELLER BRASS CO.
PORT HURON 24, MICHIGAN



Personnel

Continued

William A. Patterson, elected to the board of directors, WESTINGHOUSE ELECTRIC CORP., Pittsburgh.

Irving B. Pike, appointed sales manager, UNITED STEEL PRODUCTS CORP., Los Angeles.

Richard N. Rusch, promoted to New England sales manager, ACME WELDING, Division of The United Tool & Die Co., West Hartford, Conn.

H. B. Hollingshead, appointed New ATED STEEL CORP., Pittsburgh. York district sales manager, FEDER-

W. R. Wyckoff, appointed to new position of assistant manager, Midwest Sales Div., Chicago, TOWNSEND CO., New Brighton, Pa.

Harry Carlson, appointed to the Market Development Dept., BAKELITE CO., a division of Union Carbide & Carbon Corp.

R. A. McCarroll, appointed master mechanic, Detroit plant, PLYMOUTH MOTOR CORP.

Andrew A. Root, joins staff of FREDERICK S. BACON LABORATORIES, Watertown, Mass.

John P. Fierst, appointed district sales manager, Cincinnati sales office, SHARON STEEL CORP., Sharon, Pa.

Robert J. Langan, named grinding wheel sales representative, New York metropolitan area, ELECTRO REFRATORIES & ABRASIVES CORP., and Donald W. Greve, named grinding wheel sales representative, Pittsburgh, Western Pennsylvania and West Virginia.

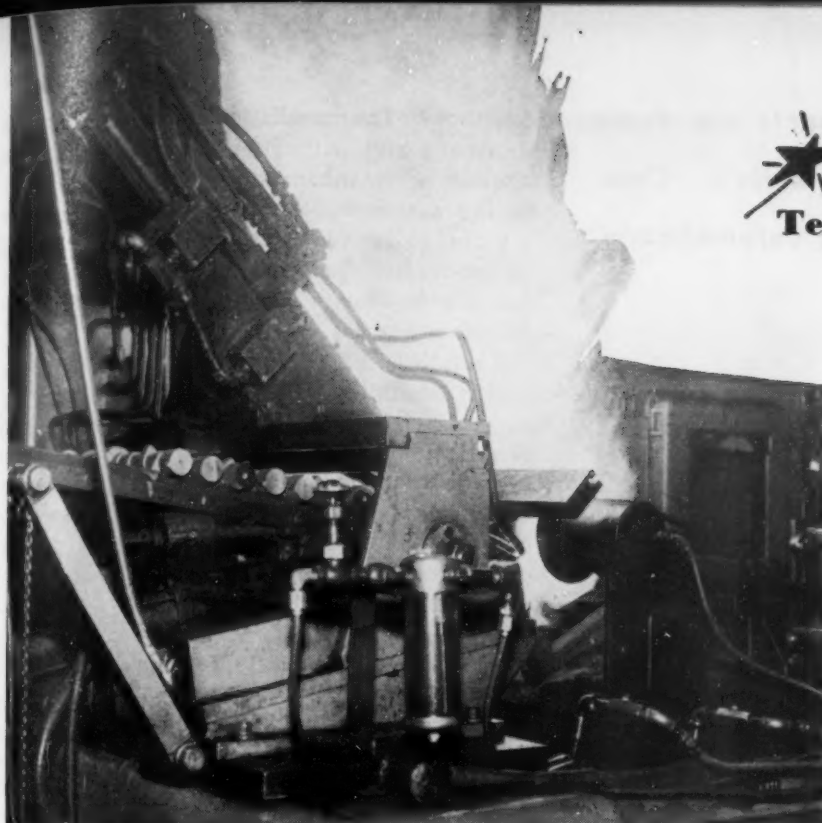
OBITUARIES

Gaston F. DuBois, 73, prominent consulting engineer, and former officer and director, Monsanto Chemical Co., St. Louis, at Barnes Hospital, St. Louis.

Harold B. Thomas, founder, Elastic top Nut Corp. of America, in Orange Memorial Hospital recently.

J. Paul Bindyke, 57, a metallurgical engineer, Heppenstall Co., Pittsburgh, recently.

W. Earle Shumway, manager of sales engineering, Norton Co., Worcester, Mass., recently.



FEEDING of camshafts into flame-hardening unit is completely automatic. The gravity magazine-type rack holds a maximum of 15 shafts.

Selective Flame Hardening Improves Camshaft Wear Resistance



By W. G. Patton
Asst. Technical Editor

◆ Camshafts for Chrysler engines are selectively flame hardened at the rate of 100 per hour . . . Five Cincinnati Flamatics, automatically cycled, maintain close control over the hardness pattern . . . Hardness penetration to $\frac{1}{8}$ in. requires 37 sec for a six-cylinder shaft and 48 sec for an eight-cylinder shaft.

◆ Besides high production and close control, the installation features versatility and safety . . . Hardening of six and eight-cylinder shafts is done in all five units simultaneously . . . Drastic change in shaft design merely requires a new set of burners . . . Little carry-out, plus stability of quenching oil makes same oil usable for as long as a year.

◆ EVERY AUTOMOBILE camshaft gets wear resistance processed into it, but the method used to acquire this essential property makes a big difference in processing time, cost and quality. Some gray iron camshafts receive no heat treatment, but in such cases, close analytical control is necessary. An alternate method is to harden them selectively or totally. Selective hardening not only produces a controlled hardness pattern which offers outstanding wear resistance but the core remains relatively soft and desirably ductile.

Since 1949, Chrysler's Winfield plant in Detroit has produced more than 4 million flame-

hardened camshafts for passenger cars, trucks and industrial engines. Parts with as many as 16 cam lobes and one eccentric are hardened at rates up to 100 per hour. Hardening is done in a battery of five Cincinnati Flamatics which, because they are identical, permit wide interchangeability of parts.

Control of hardening time is maintained to within $\frac{1}{10}$ sec. Parts fed into these machines are hardened, then quenched in oil and removed from the bath automatically. By directing as many as 420 tiny flames at the cam lobes and eccentric, the hardness pattern is closely controlled under very high production

Seven different parts are flame hardened in these units . . . Camshafts are fed in automatically.



CAST CAMSHAFTS are delivered by conveyor from adjacent foundry. Before hardening, they are shot blasted, cut to length, center drilled.

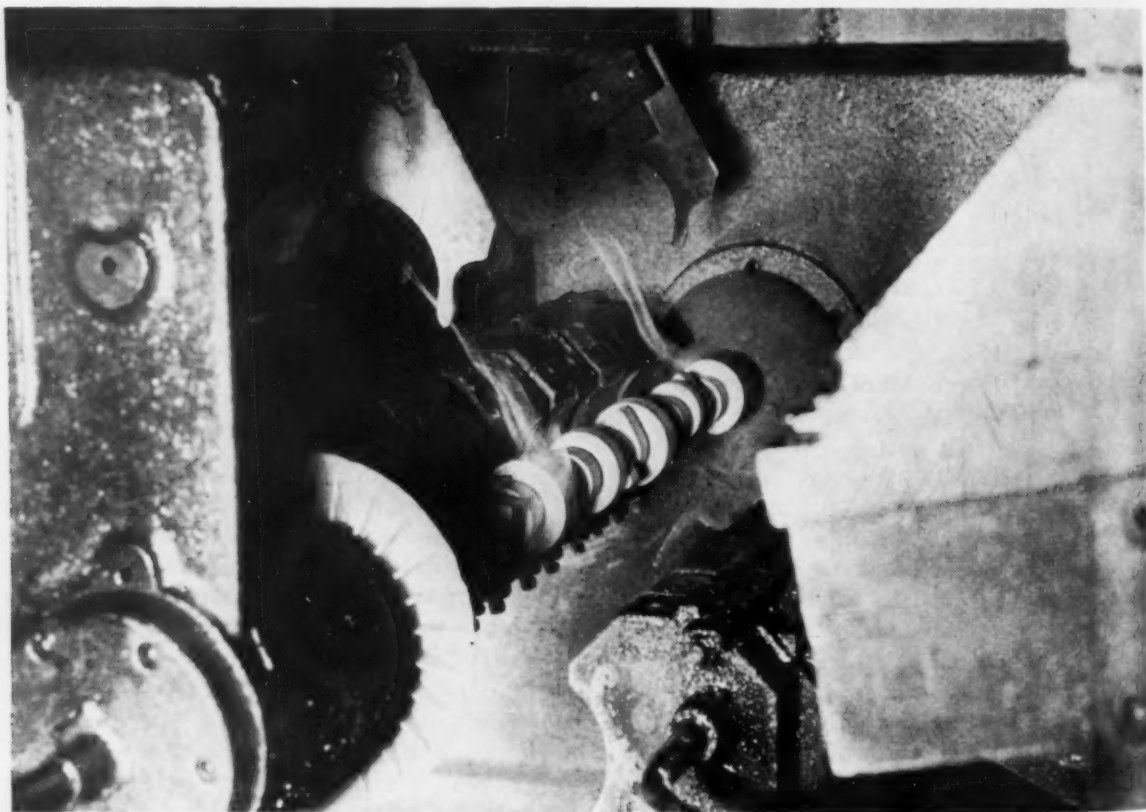
conditions. The installation's compactness gives unusually high output for the floor space. Production per manhour is probably the highest in the automotive industry. During the past 4 years, no serious interruptions have occurred in production because of repairs or maintenance even though the equipment has been in use 16 hr per day.

Versatility of the equipment is one of its major advantages. Camshaft production for six- and eight-cylinder cars can be run in all five machines simultaneously. After a tooling change, requiring no more than 2 hr, output can be divided, if desired, among passenger cars, trucks or industrial engines. A drastic change in cam design merely requires a new set of burners.

At present, the units flame harden seven different parts. Camshafts for six-cylinder engines vary as much as 2 in. in length while those for eight-cylinder engines vary by 1½ in. Hardening of two shafts used in seven different engines is done without a change in burners.

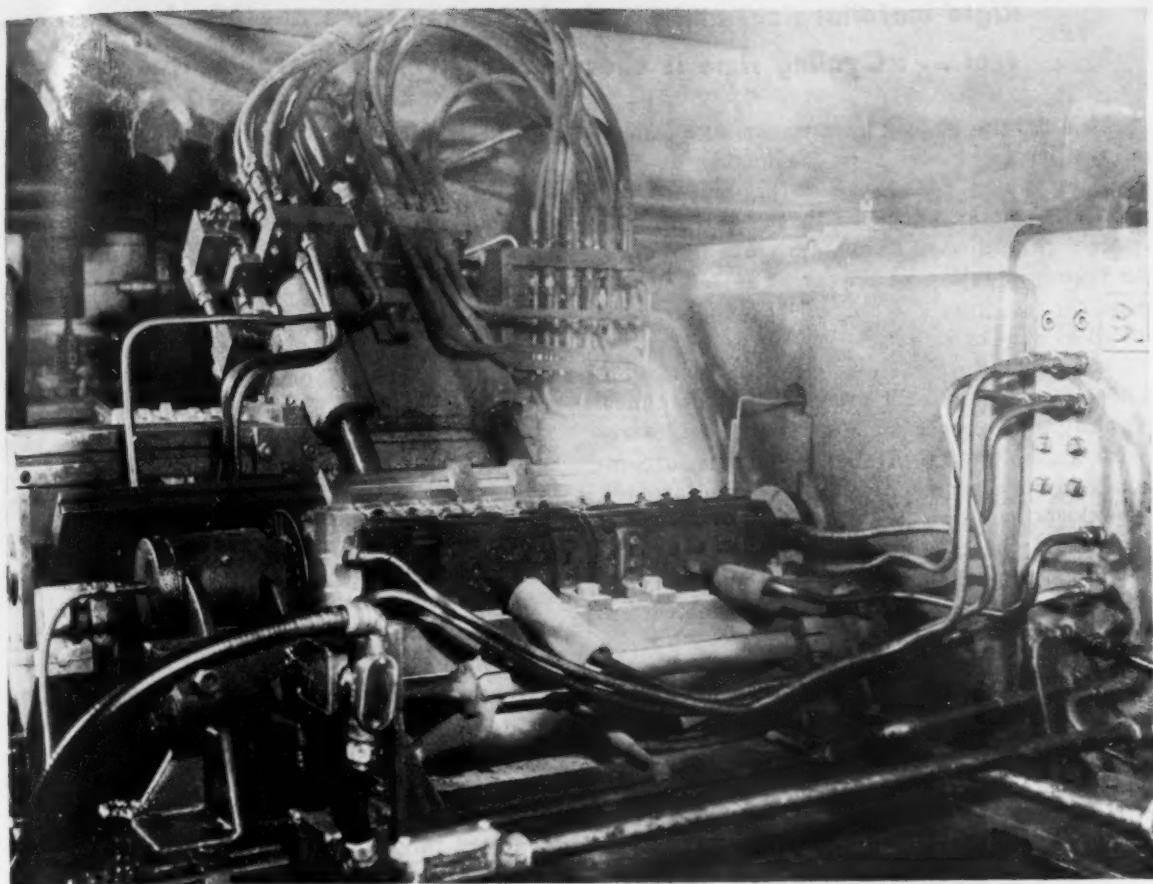
Shafts are cast in the adjacent Winfield foundry. After shakeout, they are shot blasted, cut to length and center drilled.

Feeding of shafts into the machine from a gravity magazine-type feeder is completely automatic, as is the machine cycle. A pair of steel arms picks off the closest shaft in the



TWO STEEL ARMS pick cams off loading rack and position them between retractable centers.

Two pilot lights assure positive gas ignition. Six-cylinder camshaft requires 375 burner tips.



BURNER UNITS are made in half sections. The back burner is fixed but the front burner retracts

to allow for positioning of shafts. Automatic safety controls are built in unit.

loading rack and raises it into position between two retractable centers. Two pilot lights assure prompt ignition of the 3-to-1 oxygen-propane mixture.

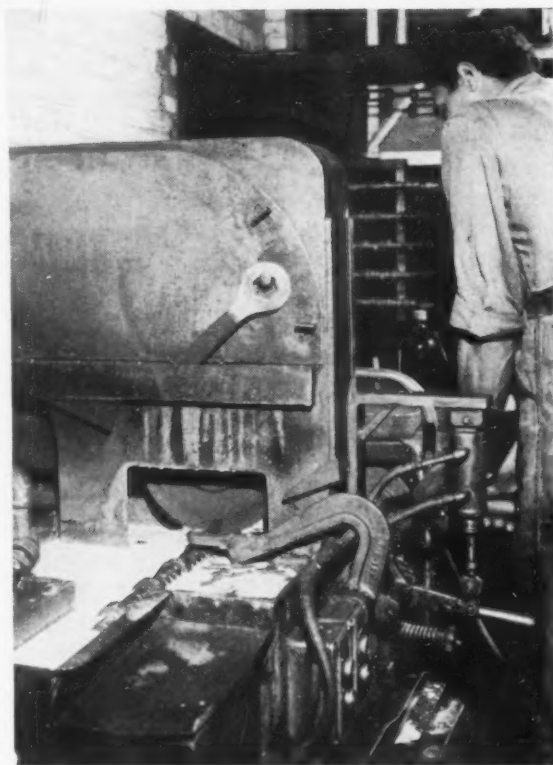
Camshafts spin at 100 rpm but the number of rotations per shaft depends on their time exposure to the flame. A typical six-cylinder shaft, for example, requires 37 sec to produce proper hardness penetration while several of the eight-cylinder shafts require 48 sec. Exposure depends on size and design of the shaft as well as other factors.

During heating, the retractable centers automatically adjust themselves to changes in length of the part. Flame tips are within $\frac{1}{8}$ in. of the part as it rotates. Tips of the cam lobe pass through the flame. Surface temperatures of the six- and eight-cylinder camshafts reach about 1650° to 1750°F respectively.

Specifications call for an 0.010-in. case depth after grinding but the case depth for most camshafts after hardening is about $\frac{1}{8}$ in. Hardnesses attained in machinable areas stay within the range of 269 to 302 Bhn.

Burner design depends on camshaft design, the hardness pattern desired and other factors. Each group of cam lobes requires a fixed back burner and a retractable front burner.

Burners are made in half sections. After



SECTIONING of camshafts for metallurgical specimens is done under water with a rubber wheel. This eliminates polishing for etching.

Rigid metallurgical and physical checks assure continued quality control . . . Cycling time is checked hourly with a stop watch . . .

machining the gas and water passages, small alloy tips are inserted in the burner at each location where a flame is to impinge on the shaft. The tiny openings in the tip are protected while a hard chromium plate is applied to resist oxidation and wear. The number of tips ranges from 375 for a six-cylinder camshaft to 420 for an eight.

Rigid metallurgical and physical checks assure close control over production at all times. Cycling time of each machine is checked hourly with a stop watch. At the same time, a camshaft from each machine is sectioned at each cam location. This is done under water with a rubber wheel, eliminating polishing. After etching with a 20-pct nitric acid solution, the hardness pattern is examined for penetration, uniformity and macrostructure.

The gray iron camshafts are a chrome-moly alloy with an analysis of 3.25 to 3.35 pct C, 0.55 to 0.95 pct combined carbon, 0.65 to 0.80 pct Mn, 2.10 to 2.40 pct Si, 0.90 to 1.0 pct Cr and 0.40 to 0.60 pct Mo. Tensile strength exceeds 44,000 psi in the as-cast condition.

Propane is supplied to the flame-hardening units at a 40-psi pressure from an 18,000-gal storage tank located outside the building. Oxygen line pressure is 150 psi. Intermediate regulators control gas flow and reduce pressure to

a desirable working level. Water pressure is 50 psi but since this is higher than city pressure, a booster pump must be used.

Quench-tank capacity is 8 bbl of Houghton G quenching oil. Since there is little carry-out, the amount of makeup is small. Cleanliness of the parts and the stability of the quenching oil make it possible to use the same oil for as long as a year. Moisture accumulating in the tank is drained off at the bottom of the tank.

Following the hardening operation, camshafts are washed with water spray in a two-stage washer. A check for straightness is the final operation prior to machining.

Special precautions are always taken to insure safe operation of the equipment. The propane storage tank is tested periodically at a pressure of 300 psi in both air and water tests. None of the delivery lines are exposed, and outside lines are protected against accidental bumping. Flash-back arresters are used on each unit. If, for any reason, a sudden surge of gas occurs, the supply is cut off automatically at the storage tank.

Regular weekly inspections are made with a leak-detecting device. As an extra precaution, steam jets were installed in the stack to help control any fire that may break out.

NEW BOOKS

"Properties of Metallic Surfaces," contains papers presented at a symposium organized by the Metal Physics Committee of the Institute of Metals and held in London last year. The 13 papers cover a wide range of properties of metallic surfaces. The Institute of Metals, 4 Grosvenor Gardens, London, S.W.1. \$5.50. 368 p.

"Weldability of Steels," by R. D. Stout and W. D'Orville Doty, evaluates the mass of data accumulated during the past 15 years on the weldability of carbon and low-alloy steels. Sponsored by the Weldability Committee of the Welding Research Council and the American Iron and Steel Institute, the research project which resulted in this book studied all factors affecting weldability. Methods for welding commonly used steels are reviewed. Evaluates weldability tests. Welding Research Council, 29 West 39th St., New York. \$6.50. 381 p.

"Productivity In The Light Flat-Rolled Segment Of The Steel Industry," by T. F. Walsh, S.J. Father Walsh has continued his studies of steel economy with a comprehensive analysis of pro-

ductivity in an important part of the industry, the strip mill. Bulking large among the reasons for increased productivity is the large investment in equipment.

To assign to capital equipment alone, however, full credit for productivity increase is perhaps an oversimplification. Other factors include improvements in rolling practice, greater labor skill, careful scheduling of product mix to reduce equipment changes, and the productive impetus afforded by incentive rates of pay. These have resulted in marked decreases in man-hour requirements per ton of product. At the same time, uniformity and quality of product have substantially improved.

This is the third in a series of publications issued in connection with the Industrial Economics Program at Fordham University. Purpose of the program is to develop greater understanding of fundamental economic problems in heavy industry. As far as practical, material is based on first-hand observations of operations in key plants. Copies may be obtained free by writing W. T. Hogan, S.J., at Fordham University, New York 58, N. Y.

SHRINK FITS: Holding Power Can Be Increased



By Bernard Trock
Production Metallurgist
Detroit Arsenal
Detroit

◆ Surface finish, radial pressures and time have been found to be important factors in the holding power of shrink fits. . . . Undertaken to solve a specific production problem, a recent study indicates that over a 0.003 in. per inch interference, added holding power per unit increase falls off.

◆ The smoother the mating surface, the greater the holding power, it was found Surprise finding was that parts which originally withstood 400,000 lb pressure failed at much lower loads when retested 8 months later.

◆ **HOLDING POWER** of shrink fits is tied to surface finish of mating parts, radial pressures, and, in some cases, to how long the parts have been fitted together, a recent study indicates. Shrink fits are used primarily where a holding power greater than that of a force fit is required. This type joint is useful in heavy construction because of its great strength. It is used extensively in construction of Ordnance automotive vehicles, particularly where space, weight, or design limitations make it impractical to use a standard fastener.

One component, which specified an interference of 0.014 to 0.017 in., caused trouble in assembly. Expansion required for mating often required heating the female component above its previous tempering temperature resulting in a lowering of hardness and a subsequent decrease in strength. This difficulty prompted an investigation of shrink fits to determine whether or not the large interference could be safely reduced and in turn lower the temperature required for expansion.

Observations from these tests are as follows:

1. When interference increased above 0.003 per inch the added holding power per unit increase in interference was greatly reduced. This suggests there is an optimum value of interference in inches per inch which will give maximum holding power.

2. The smoother the mating surface the greater the holding power for a given interference.

3. The manner of failure is correlated to radial pressure and surface finish.

Radial pressures exerted by shrink fits were calculated for steel rings on solid steel shafts using Lamé's equation:

$$P = El \frac{(c^2 - b^2)}{2bc^2}$$

Where,

P = radial pressure in psi.

E = Modulus of elasticity (30×10^6 psi for steel).

l = $\frac{1}{2}$ the total interference in inches.

c = Outer radius of the hub in inches.

b = radius of the shaft in inches.

Axial holding power exerted by a shrink fit was calculated from the formula:

$$F = \pi d L f P$$

Where,

d = Shaft diameter in inches.

L = Length of the contact surfaces of the mating parts in inches.

f = Coefficient of friction (0.30 for steel on steel).

P = Calculated radial pressure.

F = Minimum force required to separate components.

A survey of all the shrink fit applications showed that most shaft diameters ranged from 3 to 4 in. and interferences from 0.003 to 0.015 in. This set dimensional limits of the test samples. Hub inside diameters were to be

Shrink fit applications studied showed most shaft diameters ranged from 3 to 4 in. and interferences from 0.003 to 0.005 in.

3.000 and 4.000 in. Interferences were to be from 0.003 to 0.015 in. in steps of 0.003 in. Due to size limitations on available material, hub walls were held to 1 in.

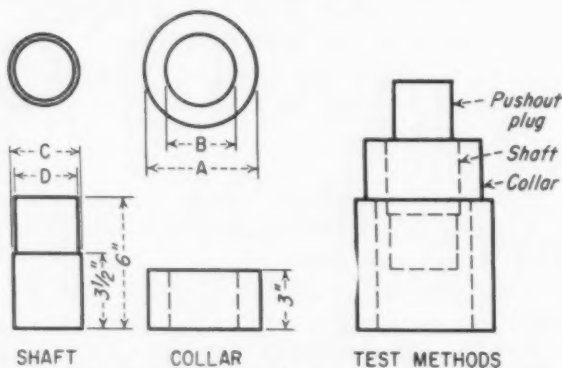
For the first series of tests 10 rings and 10 shafts were made of 4340 steel quenched and tempered to RC 32 to 36. Mating surfaces were ground to a finish of 10 to 12 microinches. Rings were furnace heated to 1000 F, while shafts were cooled to -110 F in a mixture of dry ice and trichlorethylene. The units were then assembled, and after reaching room temperature were tested.

Failed samples showed scoring

The test piece was placed on a thick walled tube with square and parallel ends. A solid steel cylinder $2\frac{7}{8}$ in. in diam was located in the center of the end of the shaft. The assembly was then placed in an Olsen tensile tester of 400,000 lb capacity and the load applied until either the sample failed or the capacity of the machine was reached. A piece was considered to have failed at the load which caused the initial movement. Samples 1, 2, 6, and 7 only, failed under the loads shown in Table I. The others showed no movement under the full 400,000 lb load regardless of the rate of load application. Samples which failed were found to be slightly scored.

For the second series, components for 10 more assemblies were made with ground shafts and machined bores. The shafts had the same finish as before but the surface finish of the ring bores ranged from 60 to 125 microinches. The material, method of assembly, and manner of testing were the same as before. Results of the tests are shown in Table II.

Several months after the first series of tests



TEST PIECES included shafts and collars. When assembled, these were set up on a thick-walled tube. Using a pushout plug and 400,000 lb press, shafts were pushed out of the collars. The D dimension given for the shaft is not critical and is about $\frac{1}{4}$ in. less than the C dimension.

TABLE I

GROUND SHAFTS AND BORES

Sample No.	Ring diameter in in.		Shaft diam in in., C	Mean Interference in in.	Separating Force, lb	
	A (OD)	B (ID)			Actual	Calculated
1	5	3.00025-3.0005	3.00325	0.00287	109,000	78,000
2	5	3.0005-3.0006	3.00625	0.00570	170,000	150,000
3	5	3.00015-3.00020	3.00915	0.00898	180,000	243,000
4	5	3.0000-3.0004	3.01225	0.01205	316,000	328,000
5	5	3.0002	3.01520	0.0150	333,500	406,000
6	6	3.9999-4.0003	4.0028	0.0027	60,000	63,800
7	6	3.9999-4.0001	4.00565	0.00565	120,000	133,000
8	6	3.9998-4.0002	4.00875	0.00875	351,000	208,000
9	6	4.0003-4.0009	4.01220	0.0116	353,500	274,000
10	6	4.0002-4.0006	4.01485	0.01445	274,000	340,000

TABLE II

GROUND SHAFTS AND MACHINED BORES

Sample No.	Ring diameter in in.		Shaft diam in in., C	Mean Interference in in.	Separating Force, lb	
	A (OD)	B (ID)			Actual	Calculated
11	5	2.9996-3.0005	3.0024	0.00231	58,000	62,700
12	5	3.0005-3.0011	3.0056	0.00479	124,000	130,000
13	5	3.0010-3.0018	3.0085	0.0071	158,000	192,500
14	5	3.0000-3.0016	3.01145	0.0106	250,000	288,000
15	5	3.0013-3.0026	3.01465	0.0127	250,000	346,000
16	6	4.0010-4.0016	4.0025	0.00116	51,000	27,400
17	6	3.9998-4.0019	4.0055	0.00453	74,000	107,000
18	6	3.9984-3.9994	4.0081	0.0092	205,000	249,000
19	6	3.9994-4.0005	4.0113	0.01135	270,000	268,000
20	6	3.9995-4.0020	4.0144	0.0136	284,000	321,000

TABLE III

GROUND SHAFTS AND RING BORES

Ring diam (bore) in in.	Mean Interference in in.	Load in Pounds		
		1st Movement	Max Load	Follow Up
3	0.00287	109,000	109,000	55,000
3	0.00570	170,000	170,000	120,000
3	0.00898	180,000	280,000	145,000
3	0.01205	316,000	316,000	190,000
3	0.01500	333,500	333,500	10,000
4	0.00270	60,000	60,000	27,000
4	0.00565	120,000	120,000	60,000
4	0.00875	351,000	398,500	155,000
4	0.01160	353,500	353,500	225,000
4	0.01445	274,000	274,000	225,000
3	0.00231	58,000	58,000	26,000
3	0.00479	124,000	124,000	55,000
3	0.00710	158,000	206,000	"
3	0.01060	250,000	285,000	"
3	0.01270	250,000	388,000	"
4	0.00116	51,000	51,000	"
4	0.00453	74,000	74,000	"
4	0.00920	205,000	226,000	"
4	0.01135	270,000	307,000	"
4	0.01360	284,000	320,000	"

^a Pressure dropped steadily with no leveling off.

the six assemblies which had not failed originally were tested as before on a 5,000,000 lb Baldwin Southwark tensile test machine. All the samples failed at loads under 400,000 lb. See Table I, samples 3, 4, 5, 8, 9, and 10.

Failure occurred in one of three ways:

1. For one group, maximum pressure required for complete separation was that which caused the initial movement. This value dropped sharply to a much lower figure and oscillated

there until an appreciable portion of the shaft was exposed, about $\frac{3}{4}$ in., after which it decreased slowly. The oscillating load is referred to as the "follow up load." Samples which failed in this manner were 1, 2, 4, 5, 6, 7, 9, 10, 11, 12, and 17, Table III.

2. For a second group the pressure, which caused the initial motion, rose gradually as the shaft moved out of the ring reaching a peak value when approximately $\frac{3}{4}$ in. of shaft was exposed. Pressure then began to decrease steadily. Samples which failed, 13, 14, 15, 16, 18, 19, and 20, all showed signs of galling.

3. The third group may be considered a combination of 1 and 2 above. Pressure continued to rise after the initial movement as in case 2 but after reaching a peak value dropped sharply and began to oscillate at a value below the initial load. This pressure began to decrease slowly after about 1 in. of shaft was exposed in a manner similar to case 1. Samples failing in this manner were 3 and 8. These two samples differed only in shaft size; the interferences and surface finishes being approximately equal.

Analysis of the three types of failure shows Type 1 occurred when either smooth surface finish or low unit radial pressure, or both, were present. Type 2 occurred when high radial pressures were combined with a rough surface finish. These results indicate that possibly the

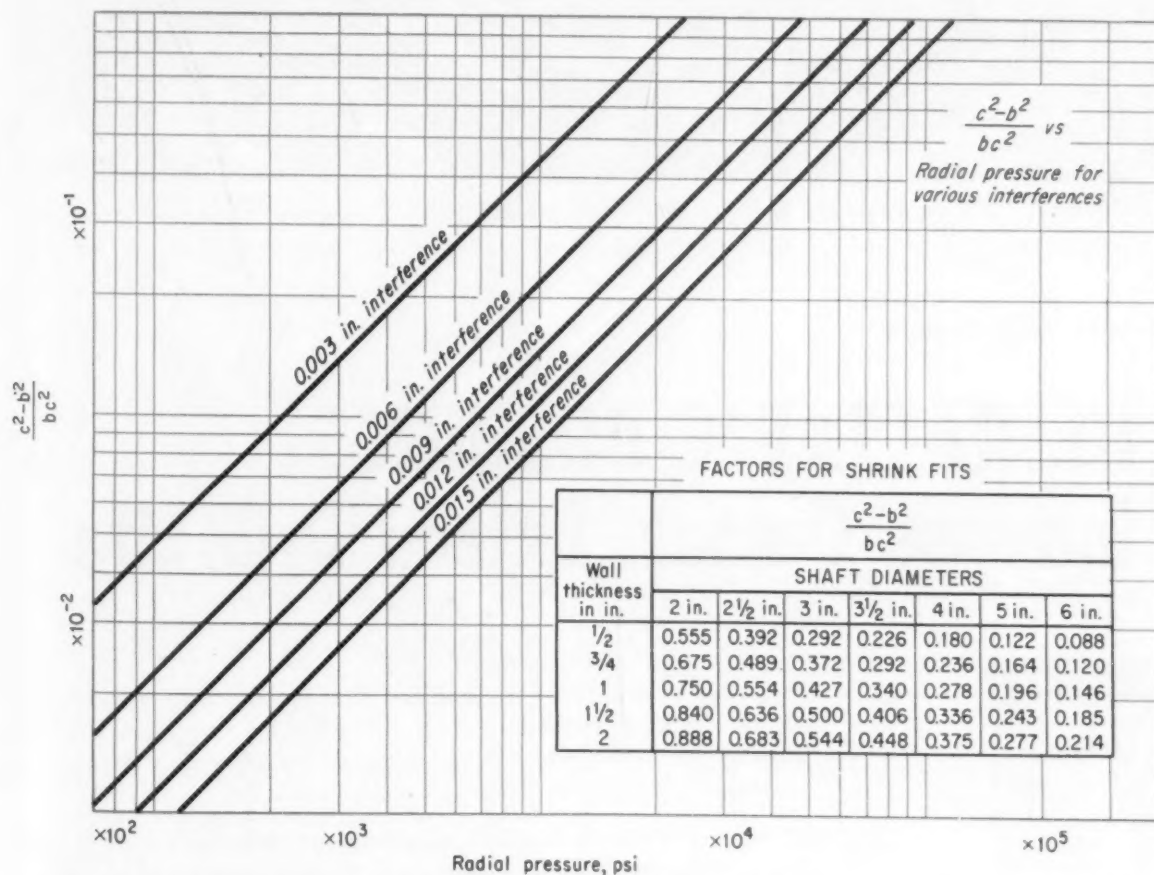
manner in which failure will occur can be predicted if the surface finish and radial pressures are known. However, it will be necessary to establish the correlation between them first.

Least expected and most surprising feature of the tests was the decrease in load required to cause failure in samples 3, 4, 5, 8, 9, and 10. These pieces, which originally withstood 400,000 lb pressure at various rates of load application, failed at much lower loads when retested approximately eight months later; 180,000 lb in the case of sample 3. This difference cannot be attributed to a faulty testing machine since both machines were carefully tested and checked by factory experts shortly before the tests were run. This result suggests that time is another factor to be considered when designing shrink fits with high radial pressures. However further testing is necessary for verification.

An examination of Lame's equation showed radial pressure was a function of the factor c^2-b^2

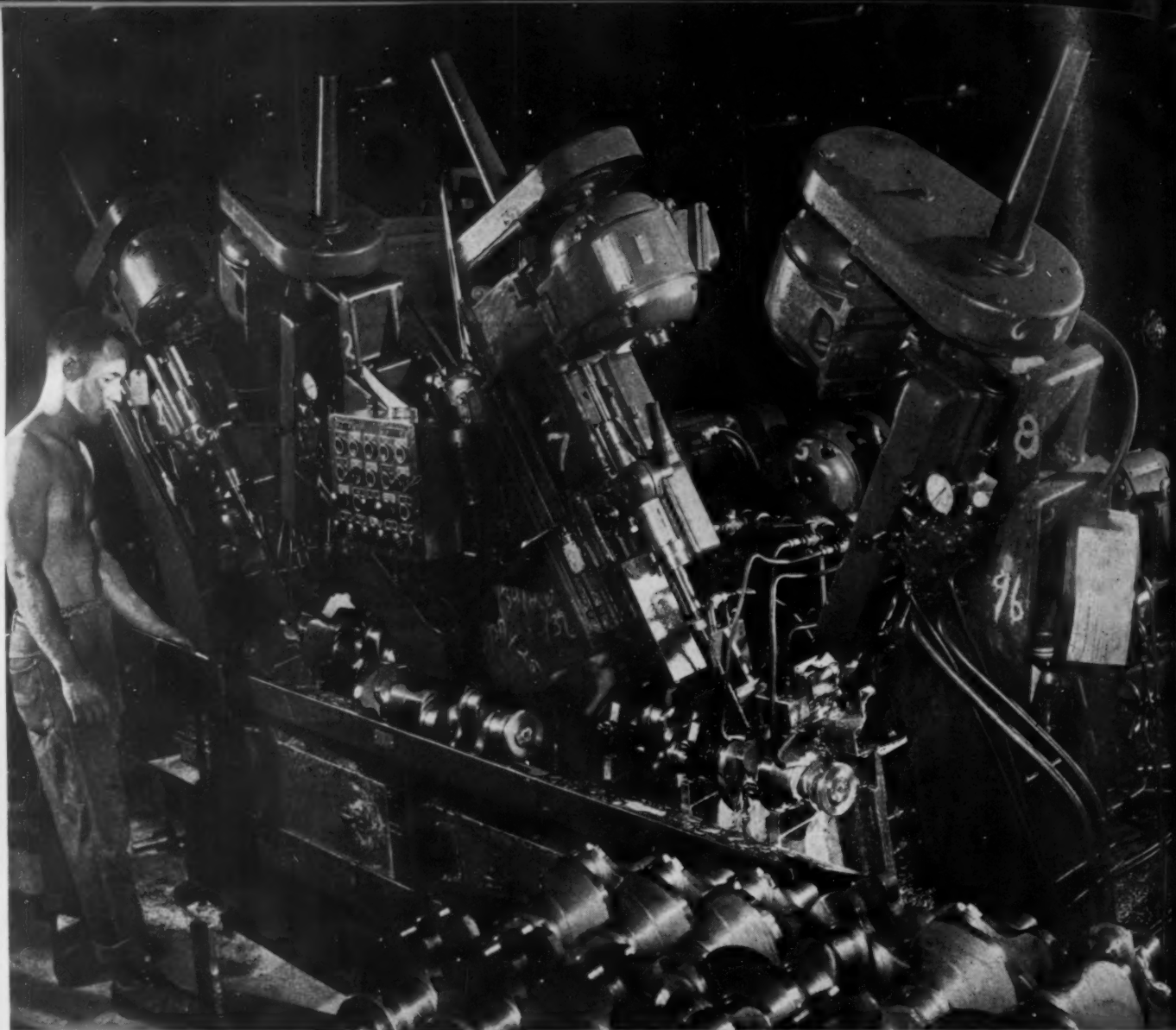
— and could be plotted against it as a bc^2

straight line on log-log paper, as in the drawing. With this figure the radial pressure developed in a shrink fit can be quickly determined if the shaft size and hub thickness lie within the scope of the graph.



RADIAL PRESSURE developed in a shrink fit can be quickly determined if the shaft size and hub

thickness lie within the scope of the graph. Holding power is greater if surfaces are smooth.



RETRACTABLE bushings are used on this 8-spindle machine for drilling oil holes in V-8

crankshafts. Four holes are drilled in unit at right and remaining four holes in drilling unit, left.

Fewer drill changes—

RETRACTABLE BUSHINGS Increase Output, Extend Drill Life



By E. C. Beaudet
Technical Editor

♦ Drilling oil holes in V-8 crankshafts at Studebaker has been speeded up by the use of retractable bushings . . . After the first $\frac{1}{2}$ in. is drilled, bushings are withdrawn . . . Remainder of the distance is drilled in $\frac{1}{4}$ in. steps.

♦ Method is seen to have several advantages over using fixed bushings . . . Withdrawing bushings permits 1.5 in. more of each drill to be used . . . Downtime for drill changing is lessened . . . Considerable drill breakage is avoided . . . Chip clearance is better.

◆ **INCREASED DRILL LIFE** and less downtime due to drill breakage and changing in drilling oil holes in V-8 crankshafts is achieved at Studebaker Corp., South Bend, Ind., by means of retractable drill bushings. In drilling these holes, bushings are removed after the first drilling pass and the remainder of the hole is step-drilled without a bushing.

Studebaker engineers who designed the fixtures report this arrangement has resulted in almost no drill breakage because of better chip clearance and little or no seizing of chips between the bushing and the work. Removing the bushing after the first step permits 1.5 in. more of each drill to be used, which would have been lost if fixed bushings were used.

Eight oil holes drilled

In this production setup, a battery of four 8-spindle Leland-Gifford machines each drill eight oil holes in the V-8 crankshaft, from the main bearing to the pin bearing. The machines consist of a special fabricated welded-steel base which supports eight 10-in. hydraulic-drill feeds having step by step control and driven by a 5 hp single-speed motor with a V-belt drive. Four of the drilling units are mounted in a 10° vertical-angular position and the other four are mounted in the rear in a 10° horizontal-angular position.

BUSHINGS IN POSITION during first cycle. Right hand drill is withdrawn, left is still in work.

A motor driven coolant system with all connections for wet drilling is used. Holding fixtures and sliding bushing plates are hydraulically operated. Remote control valves start each of the four drilling units simultaneously. Control valves also govern operation of the hydraulically-clamped holding fixtures and hydraulically-operated sliding bushing plates.

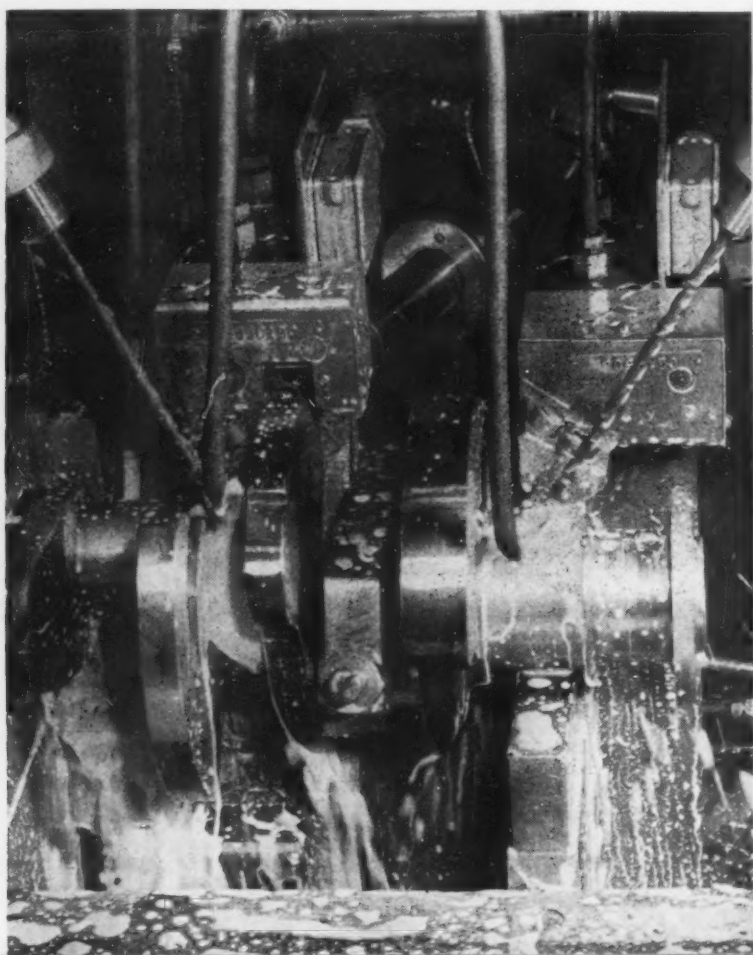
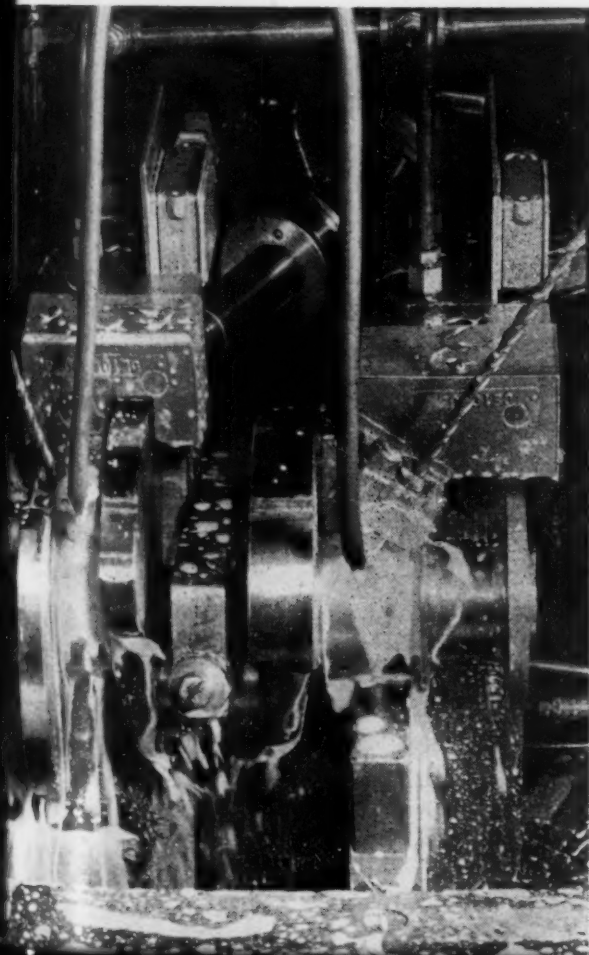
Fixed machines preferred

Studebaker preferred to use a number of fixed machines of this type rather than a transfer machine because of lower maintenance costs and probably higher overall production due to the fact that downtime on one station on the unit-type machines would not shut down the entire line. Uncertainty of drill life and the possibility of drill breakage inherent in a drilling operation were the governing factors in specifying this equipment.

Crankshafts drilled at Studebaker are C-1046 steel forgings with hardnesses ranging from 241 to 269 Bhn. Using the retractable bushings, a 20 pct increase in production is claimed possible over fixed bushing methods. Crankshaft holes are drilled at the rate of 19.5 per hr per machine. Average drill life is 400 holes per drill. This represents an increase in drill life of 200 pct.

In drilling the first four holes, an operator

BOTH DRILLS are shown in operation during second cycle with bushings withdrawn from work.



Bushing operation is electrically timed . . . The retractable bushing is held within 0.010 in. of the workpiece for accuracy . . .

places a crankshaft in the machine and then pushes a button to clamp the work in place, move the bushings into position and start the drilling cycle. Bushing action is electrically timed. After drilling $\frac{1}{2}$ in. the operator presses another button to remove the bushing and start the machine into the final drilling cycle. Final drilling is done in $\frac{1}{4}$ -in. steps. When drilling is completed, the clamp opens and the operator removes the crank. Cycle time for this operation is 2 min. The crankshaft is then manually transferred to the next four drilling units, placed in position, and the remaining holes drilled. Average depth of holes drilled is $4\frac{5}{8}$ in.

Bushing is fairly long

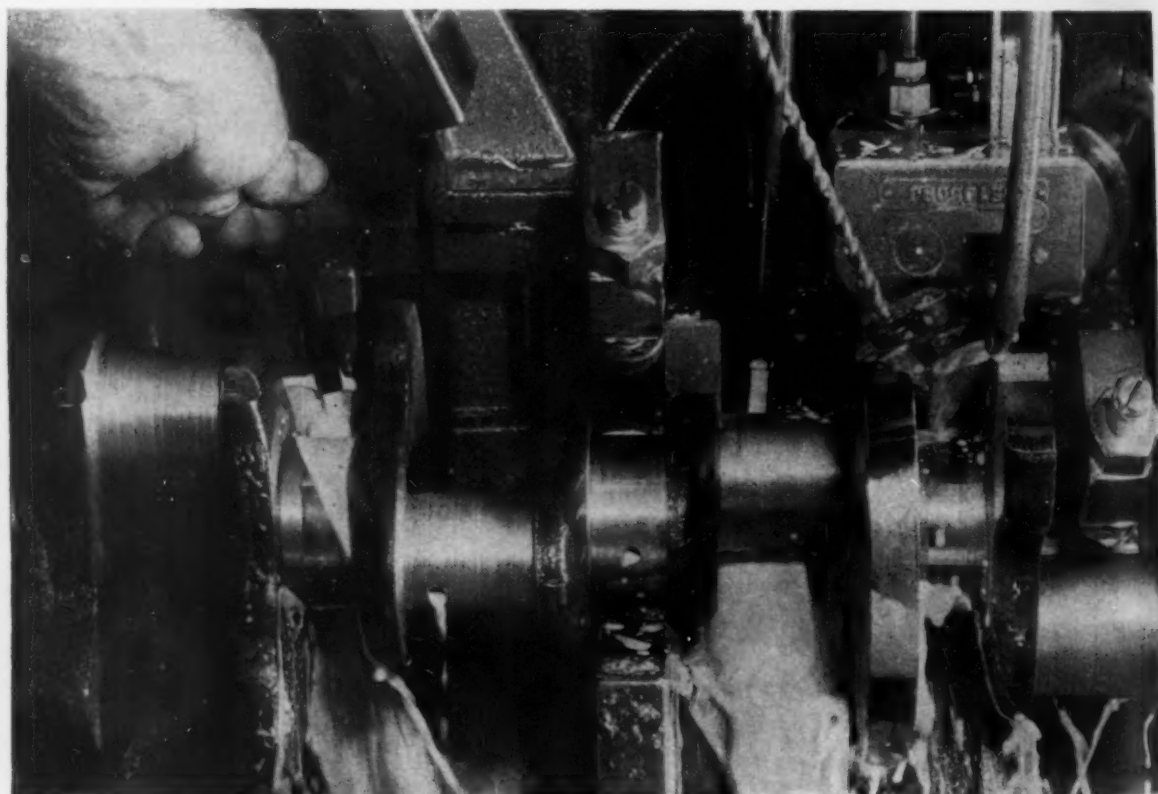
The retractable bushing used is fairly long and held very close to the work, about 0.010 in. The reason for the bushing being held this close is that Studebaker engineers felt that it would give greater accuracy at the breakout point of the hole. To allow the coolant to be properly directed at the work the machine was set at a 10° angle. Retractable bushings, eliminated use of a directed-coolant type of bushing. Therefore, the machine is tipped to allow

the coolant to get into the horizontal holes and to keep the drills cooled and lubricated.

Spindle speed for this operation has been stepped up from 600 to 865 rpm which gives a lighter chip load, permits longer drill life and higher output. Pressure on each drill ranges from 80 to 100 psi. If the pressure should happen to reach 150 psi, the drill automatically backs out of the hole, thus preventing damage to the drill and the work.

Output went up

Greater production achieved through increased speed and longer drill life permits savings to be made which more than pay for the extra cost of making bushings retractable, according to Studebaker engineers. The greatest saving is in the time saved in not having to change drills. A $\frac{1}{4}$ -in. diam 10-in. long drill is used with 2 in. of its length buried in an Erickson chuck which holds the drill securely and prevents chattering. Not having 1.5 more inches taken up by a bushing gives that much more length to be drilled without resharpener. Lack of a fixed bushing permits less breakage of drill due to the bushing hitting against the drill land.



COOLANT running through completed hole. Bore was from rear, but 10 degree tilt allows

coolant to run through the horizontal holes. This keeps drills cooled and lubricated.

Wire Thread Inserts Cut Scrap Loss

♦ **STRIPPED THREADS** in cast magneto housings no longer mean scrapping of expensive, otherwise sound magnesium castings at the Pitney-Bowes, Inc. plant at Stamford, Conn. To overcome this problem, stainless steel thread inserts are used to replace the damaged magnesium threads.

As manufactured for the Air Force, each magneto housing has six holes drilled and tapped to receive 10-32 screws. Occasionally, the threads will strip as screws are tightened to specified 45 in.-lb torque values.

Formerly, castings had to be scrapped when this occurred. Now, the housings are quickly and economically repaired with wire thread inserts.

The damaged thread is cleaned out with a drill slightly larger than the major diameter of the original 10-32 thread, see Fig. 1. Next, the hole is retapped slightly oversize with a standard Heli-Coil tap to provide female receiving threads for the insert.

A Heli-Coil wire thread insert is screwed into the retapped hole with an inserting tool, Fig. 2,

and the salvaging operation is complete. Thread size of 10-32 is reestablished and with a new thread of stainless steel instead of magnesium, torque stresses considerably higher than the required 45 in.-lb can be withstood.

It is claimed that these thread liners distribute stresses more evenly and provide a minimum loading strength 25 pct higher than conventional threads.

Air Force approval for this repair technique was obtained because of the added strength in the replacement threads, plus the fact that the wire inserts are self locking and will not be loosened by excess torque or vibration in service use. The inserts are larger in diameter than the hole and must be compressed by the inserting tool during installation. Once in place they automatically bind themselves, spring like, against the female receiving threads.

In five months since this repair technique was adopted by Pitney-Bowes, more than 50 of these magneto housings have been salvaged with wire thread inserts. Total savings have been in excess of \$850.

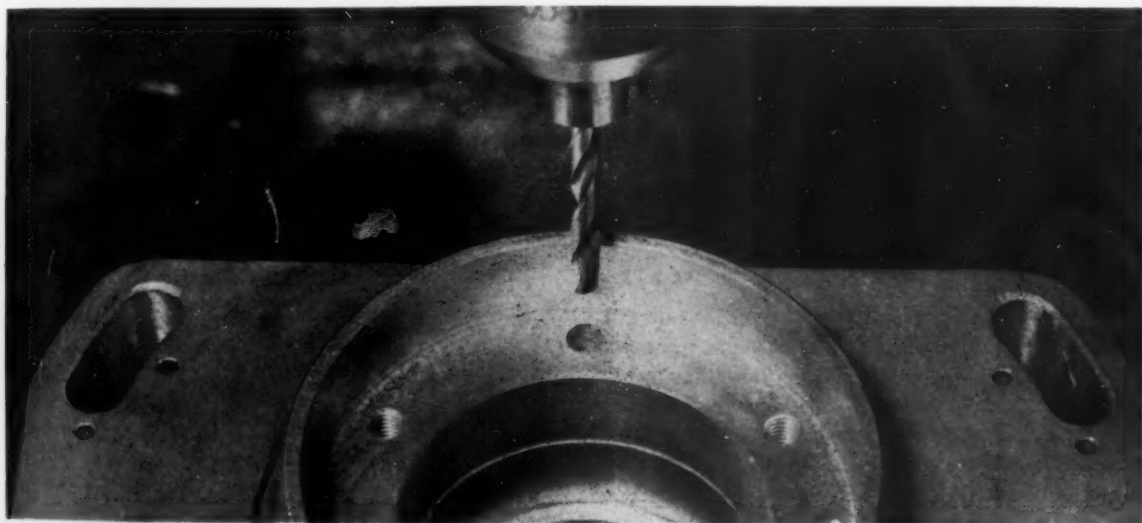


FIG. 1—Stripped thread is drilled out before tapping with standard Heli-Coil tap.



FIG. 2—Wire thread coil and inserting tool used to salvage cast magnesium magneto housings.

Strain gage at work—

Flexibility Extends Scope of ELECTRIC WEIGHING



By R. G. Watson

Project Engineer
Electrical Laboratory
Republic Steel Corp.
Cleveland

♦ Load cells, using the strain-gage principle, measure weights from 50 to 200,000 lb in a steadily increasing number of industries . . . Steel plants, warehouses, foundries, railroads and other industries are benefiting by the economy, speed, simplicity and adaptability they offer.

♦ Since 1949, Republic Steel has put them to good use in weighing coiled strip steel, scrap, molten metal, ingots and bundled products . . . Capacity, size, accuracy, convenience and ease of maintenance also favor wider application.

♦ INDUSTRY'S NEED for faster and more accurate methods of weighing materials has been receiving more attention as production schedules climb. Although the mechanical scale has proven itself reliably accurate, the need for a more flexible substitute has led to greater use of the electric strain gage to measure weight in the high-speed production line. Originally developed for strain measurement in structural and machine design, these gages now measure weight simply by observing strain in the supporting structure of a scale platform.

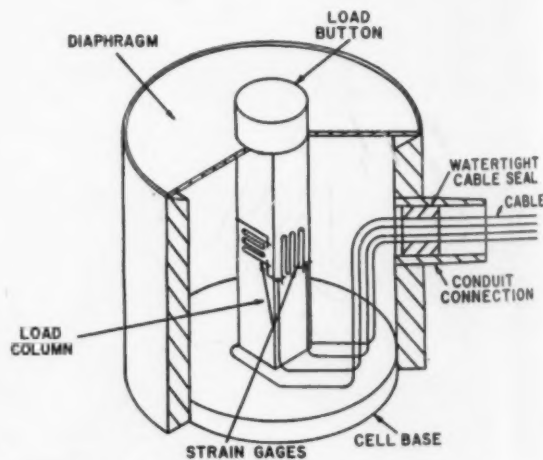
Practical application of strain gages to weighing has been by means of SR-4 load cells. These load cells are hermetically-sealed units containing a steel column on which the gages are mounted. They are built in cell capacities of 50 to 200,000 lb. A platform scale uses four such cells, one supporting each corner of the platform. Since there are no moving parts in these cells, there is no wear.

An electric cable interconnects the scale platform and dial. It is the combination of simple

platform design and the ease of establishing remote instrumentation which makes electric weighing extremely flexible.

Scale instrumentation is basically simple and reliable. While some electronic tubes are used, they are of a common type and their reliability is established. Unfortunately, the progress with electronic weighing has been slow due to a misunderstanding that the system involves complex equipment. Actually, associated automatic process control is more complex than the scale system.

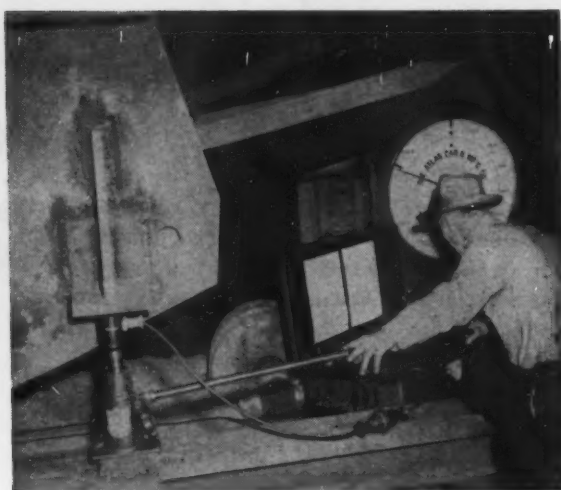
Electric scales have opened an entirely new field of thought and development in weighing methods. Even though many are in use, they will not replace the lever scale completely. Capacity, size, accuracy, convenience, maintenance,



STRAIN GAGES in load cell strain same degree as load column to which they are cemented. Any mechanical strain changes wire cross-section and length, and its electrical resistance.



STIRRUP ASSEMBLY attached to crane hook holds strain-gage load cell as weight of tubing is recorded directly on portable Electroweigh.



SUITCASE TYPE electric scale permits convenient calibration of a car scale. Load is applied to cell by using a hydraulic jack.

nance and cost are some of the factors governing the choice between the two types. Experience and experimentation show that the electric scale has particular advantages where high capacity and accuracy are involved.

The first practical application of electric weighing occurred during World War II when the Cox & Stevens Aircraft Corp. devised a suitcase type scale capable of measuring load distribution in military aircraft. The Republic Steel Corp., recognizing the need and possibilities of such instrumentation in steel plants, began using this portable device as a weight standard for checking the accuracy of production scales.

Referred to as the "Electroweigh," this instrument was mounted in a wagon for protection and transportation of its battery power supply and other accessories. Its simplicity and portability make this instrument extremely useful in solving steel plant weighing problems.

How to set load standard

Chief merit of the Electroweigh method of checking a conventional lever scale is in the greater latitude it affords. Past practice had been to use small check weights totalling a fraction of the scale capacity. Only a few points in the lower range of the scale were checked while gross errors in the higher ranges may have been undetected.

With the Electroweigh, any load which can be picked up with a crane can be weighted accurately and used as a standard. Thus, a standard weight can be obtained quickly and certified weights need not be hauled to difficult scale locations.

In some cases, the Electroweigh can be adapted to check a scale by using a hydraulic jack to load the scale platform. By placing the load cell between the jack and scale platform,

both weighing devices are subjected to the same load.

Republic's first production electric platform scale was built in 1949. It weighs coiled strip steel as it leaves a cold reducing mill. It consists of a simple platform supported by four electric load cells. Check-rods restrict longitudinal and transverse platform movement. The original installation has since been modified by moving the indicator from the end of the coil runway to a safer location on a wall. Loads up to 30,000 lb are weighed.

As a coil leaves the mill, it rolls onto the scale platform. Before the coil leaves the platform, the instrument indicates the weight and the coil rolls across a switch which locks the scale dial pointer at the coil weight. The weighmaster records the weight and resets the scale to zero for the next coil. This procedure is integrated with coil discharge from the mill and eliminates special handling. The remote location of the indicator allows maximum coil handling area with minimum scale hazard.

Excellent results have also been achieved at Republic in weighing open-hearth scrap at the stockhouse. An electric track scale automatically weighs the scrap buggies as they move along the track and over the scale at 3 mph. Weights up to 40,000 lb are printed on a tape which can be totalled and used in calculating

THESE FEATURES PREDOMINATE

- ☐ Low initial cost
- ☐ Simple pit and platform construction
- ☐ Remote indication
- ☐ Fast balance
- ☐ Ease of maintenance
- ☐ Adaptability to automatic process control

Electric weighing speeds flow of materials, simplifies steelmill weighing procedures . . .

furnace charging weights. The load cells have a capacity of 200,000 lb to accommodate the diesel locomotive weight. Dead-rails and switching, commonly used in lever-scale systems, are not needed.

Another electric weighing application at Republic speeds the flow of materials and simplifies weighing procedure. Bundled products are weighed while being transferred by crane, eliminating a separate weighing operation. This type of scale requires a special hook-beam to support and protect the load cells. The hook-beam had to be designed without loss of crane-lift height.

Initial and maintenance costs of an electric crane scale will be higher than those of a corresponding platform scale. Consequently, operating economies are most readily apparent.

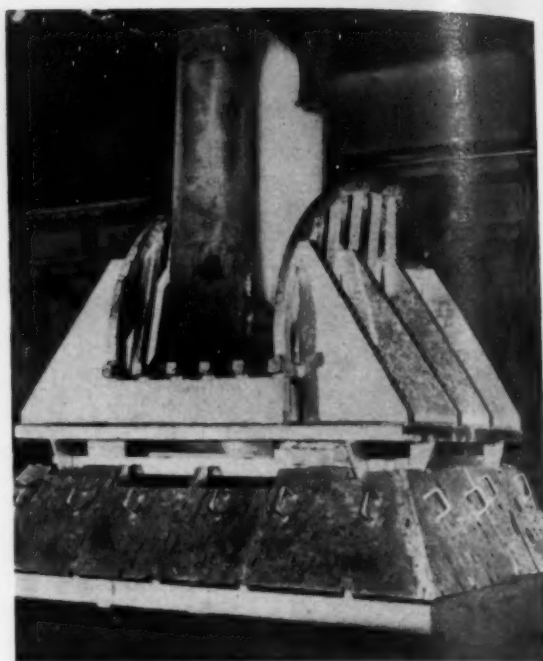
Weighing of molten metal is another application where the electric scale is outstanding in its adaptability, flexibility and economy. A typical use is in weighing the quantity of molten metal fed into Bessemer converters. When the converter has been fed the proper quantity, an alarm signals the operator. The charge is automatically recorded. Simple platform construction with high overload capacity is an important advantage in this installation.

Weighs openhearth charge

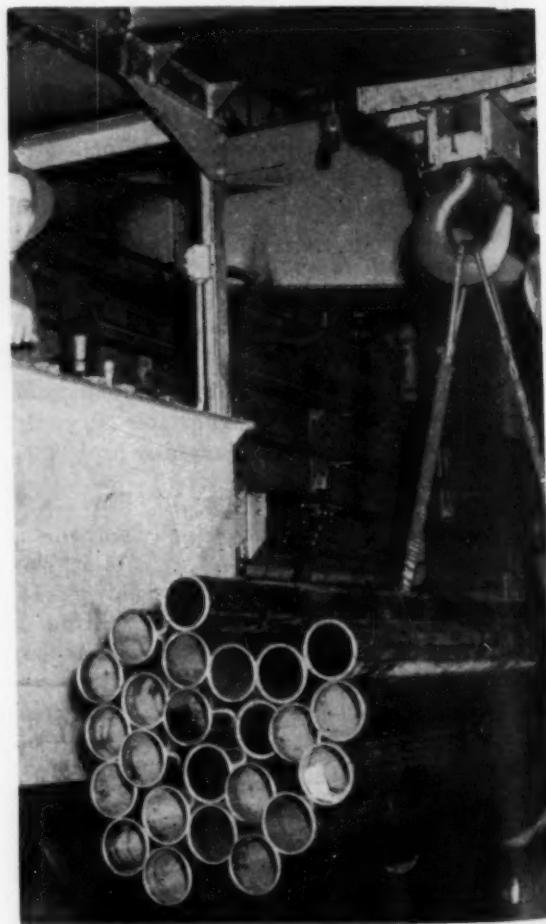
A similar scale weighs molten metal charged into an open-hearth furnace. This scale is mounted in a ladle transfer car allowing metal to be received and weighed from either of two bottle cars. Weight information is conveyed by electric cable to the scale house. The scale-pit excavation below the transfer car tracks was below river level so that the molten metal presented an explosion hazard if water seeped into the pit. These restrictions were overcome in the electric design.

Ingot weight determination immediately after stripping has also become possible by the use of an electric scale. A basket-type platform scale supports the ingot and weighs it as soon as it is free of the handling tongs. Accurate ingot weights for statistical control are readily available.

Many electric scales have been put to good use in warehouses, foundries and other industries. Railroads have done some active experimenting. Recently, the Southern Railway installed its first electric scale at its Irondale Yards near Birmingham. As a precaution, a complete knife-edge assembly was installed under the electric cells. Thus, the cells act as a check against each other.



INGOT BASKET and platform of this electric scale are specially constructed to absorb impact. Ingot weights give tonnage data on open hearths, simplify statistical control.



MODIFIED CRANE HOOK contains two 10,000 lb load cells operating in compression. Hook section is actually floating but is stabilized by tie-rods against side motion.

In homogeneous bars—

How to Develop FAVORABLE STRESS PATTERNS



By J. E. Campbell H. O. McIntire
Principal Metallurgist Assistant Division Chief
Battelle Memorial Institute
Columbus

♦ Favorable surface stresses can increase fatigue life . . . They may be obtained by selection of proper steel grades, size and heat treatment . . . Tests conducted at Battelle show how stresses are produced.

♦ Water-quenching steels develop compressive stresses at the surface . . . Surface tensile stresses develop in oil-quenched steels when through-hardened . . . And compressive stresses when not through-hardened.

Part I

♦ **PART FAILURES** due to fatigue may be lessened by the development of favorable residual stresses in the parts' surface through heat treatment. Previous tests indicate that parts with surface compressive stresses have greater resistance to fatigue failure than those with surface tensile stresses. Tests conducted at Battelle Memorial Institute show how favorable stress patterns can be developed by the selection of steels and heat treating methods.

To determine residual-stress patterns in 1.0 and 1.5-in. diam heat-treated bars a modification of the Sachs' method was used. The heat-treated bars used were 8 in. long so that end effects would not alter the stresses at the middle. Because many of the bars were tested in the as-quenched condition, cutting and boring techniques were developed which could be used on the hardened material without heating or straining it. Specimens tested were discs 1/16 in. thick cut from the middle of the bars.

Range of steels used

Steels used in the stress-pattern study covered a wide range of hardenability and carbon content, so that the effects of these factors on the stress patterns might be determined. Stress patterns were determined on water-quenched bars of the steels shown in Table I, with their compositions, M_s temperatures and hardenabilities. Compressive stresses ranged from 17,000 psi for type 430 stainless to 110,000 psi for 4340, at 0.010 in. below the surface.

Stress patterns representing the range of values obtained for the various grades of steel are shown in Fig. 1.

As the carbon content was increased to 22 pct in the 8620 steel, the hardness of the mar-

tensitic rim was greater and the residual stress near the surface increased to 86,000 psi. The 1060 steel, which had a higher yield strength in the austenitic condition, developed a still harder martensitic rim, but of shallower depth, with a compressive stress near the surface of 65,000 psi. The center of the 14B45 steel specimen showed only a slight hardness increase after quenching. However, this specimen developed a residual compressive stress of 98,000 psi near the surface.

Some plastic straining noted

Magnitude of the compressive stresses near the surface of the through-hardening specimens ranged from 73,000 psi for 8660 steel to 110,000 psi for 4340 steel. For these steels, maximum compressive stresses near the surface occurred when the carbon content was about 0.40 pct. Maximum compressive stresses were lower as the carbon content was increased. The yield strength in the austenitic condition also increased. In steels having carbon contents lower than 0.40 pct, the yield strength in the quenched condition was lower, and the maximum compressive stresses were lower.

Plastic straining was noted at the ends of the water-quenched bars. These ends, which were originally straight, had become concave after quenching. In a few of the bars, a circumferential crack developed between the outer rim, which was in compression, and the inner portion of the bar, which was in tension.

Modifications of the direct water-quenching procedure, which might reduce the tendency for distortion, were tried on 1½-in. diam bars of 4150 steel. The procedures used were (1) delayed quenching by air cooling for 2 min

"Magnitude and depth of compressive stresses were lowest for the specimen quenched 21 seconds and then air cooled . . ."

prior to quenching, (2) water quenching for 21 sec followed by air cooling, and (3) air cooling for 2 min followed by water quenching for 21 sec, then, cooling in air.

Enough residual heat would be present in the bar given the interrupted quench to cause tempering of the martensite near the surface

after quenching. Stress patterns for these bars are shown in Fig. 2. The magnitude and depth of the compressive stresses were lowest for the specimen that was quenched for 21 sec and then air cooled. Direct quenching gave the highest compressive stress. Delayed quenching did not reduce the hardness, but inter-

TABLE I

ANALYSES, M_s TEMPERATURES, HARDENABILITY

Steel Type	Chemical Composition, pct									calculated M _s temp., F*	hardenability, sixteenth in. to 50 Rc	ideal diameter for 95% martensite, in.
	C	Mn	P	S	Si	Ni	Cr	Mn	Other			
430	0.10						14.7					
8620	0.22	0.82	0.023	0.022	0.28	0.59	0.48	0.19		697	4 to 5 (30 Rc)	1.4
4333	0.32	0.62			0.19	2.00	0.79	0.24		619	10	4.25
4340	0.40	0.70	0.008	0.023	0.21	1.87	0.88	0.23		572	32+	4.9
81B40	0.42	0.85			0.27	0.38	0.47	0.10	B	615	9	2.2
8745	0.47	0.86			0.34	0.55	0.48	0.22		577	8	2.2
Cr-Mo-V	0.48	0.62			0.23	0.06	1.00	0.36	0.20V	580	14	2.9
4150	0.50	0.75	0.023	0.019	0.27	0.21	0.97	0.20		561	18½	3.4
14B45	0.51	0.76			0.21	<0.10	<0.10	<0.10	B	605	5	1.6
81B45	0.51	0.97			0.27	0.28	0.91	0.10	B	546	40+	5.7
8660	0.58	0.78			0.20	0.61	0.54	0.21		522	20	3.8
1060	0.61	0.80			0.30					546	2 to 3	1.4

* Metals Handbook, page 611, fourth equation (1948 edition).

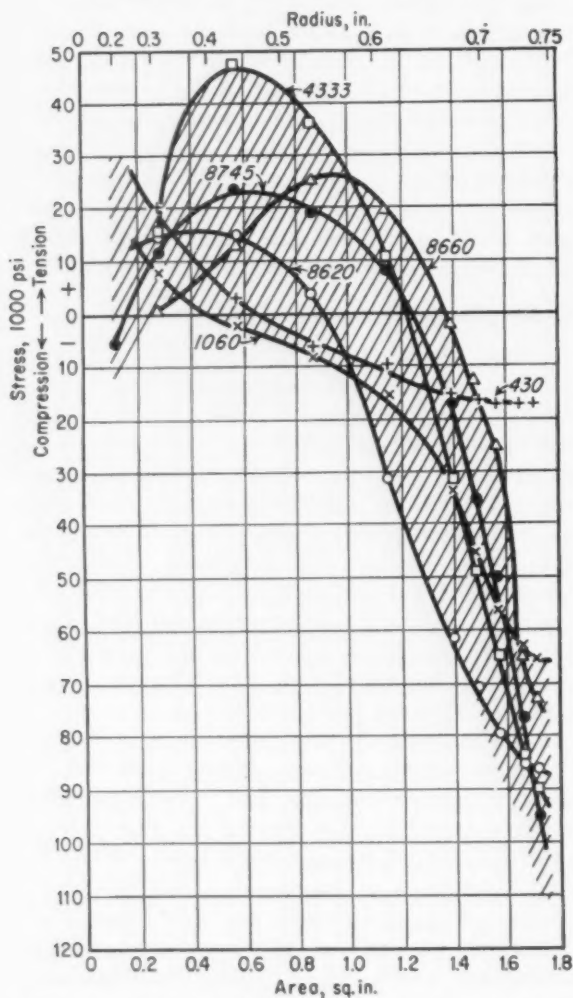


FIG. 1—Tangential stress patterns for 1.5 in. diam bars quenched in water.

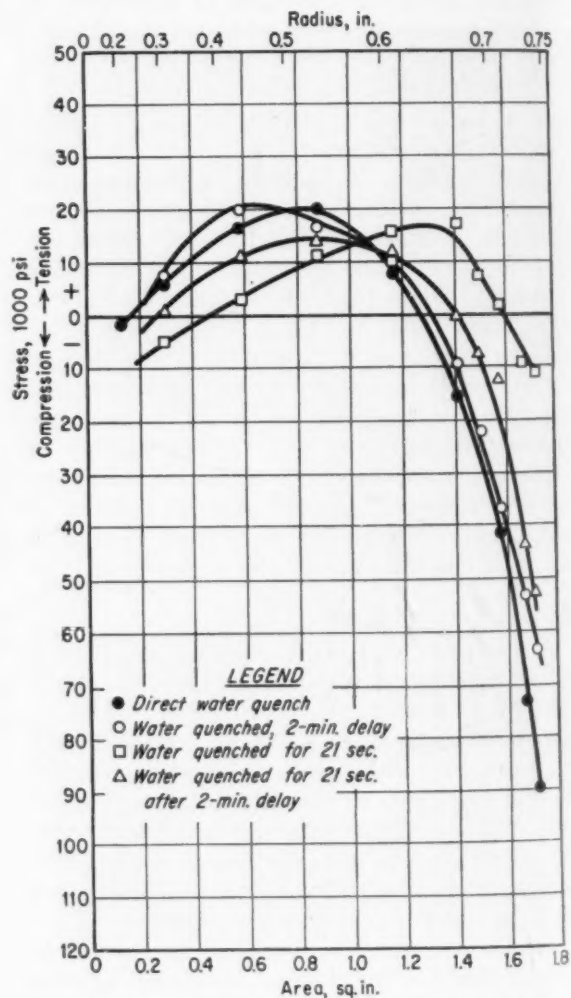


FIG. 2—Stress patterns for 1.5 in. diam 4150 bars water-quenched by various methods.

rupted quenching resulted in lower hardness as the result of tempering produced by the residual heat in the bar after quenching.

Stress patterns were determined after direct oil quenching 1.5-in. diam bars of the steels listed in Table I, except for the 8660 steel. A bar of this steel was direct oil-quenched but cracked longitudinally some time after quenching. Most of the steels direct oil-quenched were also tested after delay oil quenching. In delay quenching, the bars were air cooled from 1 to 3 min prior to quenching. The delay-quenched bar of 8660 steel did not crack.

As with the water-quenched specimens, the principal factors affecting the residual stresses were the specimen diameter, carbon content, and hardenability. For the oil-quenched specimens, compressive stresses were obtained at the surface only if the steel had insufficient hardenability to harden throughout. For through-hardening steels, the surface stresses were in tension, and, except for the 4340 steel, tended to be higher for the 1.5-in. diam bars than for 1-in. diam bars of the same steel.

Where stress changed rapidly

The stress patterns shown in Fig. 3 cover the range obtained for the direct-quenched 1.5-in. diam bars. Table II lists the maximum stress, approximate location of maximum stress, and the approximate surface stress for each of the direct-quenched specimens and representative data for the delay-quenched specimens. Maximum stresses for direct-oil-quenched specimens varied from about 40,000 psi in compression for the 14B45 steel to 33,000 psi in tension for the 4333 steel. Stresses near the surface ranged from 24,000 psi in compression for the 1060 steel to 33,000 psi in tension for 4333. Many of the stress patterns showed rapidly changing stresses near the surface. The magnitude and direction of the stresses near the surface depend on whether or not the specimen hardens throughout.

Delay quenching had this effect

Delay quenching generally resulted in somewhat lower residual tensile stresses for the through-hardening steels and higher compressive stress for the 14B45 steel which was not through-hardening. Stress patterns covering the range obtained for delay-quenched through-hardening steels are shown in Fig. 4.

Compressive residual stresses in oil-quenched specimens which do not harden to the center can be explained for the most part by the difference in specific volumes of the martensitic rim and the higher temperature transformation products at the center. These constituents have lower specific volumes than martensite and place the martensitic rim in compression after the specimen cools to normal temperatures.

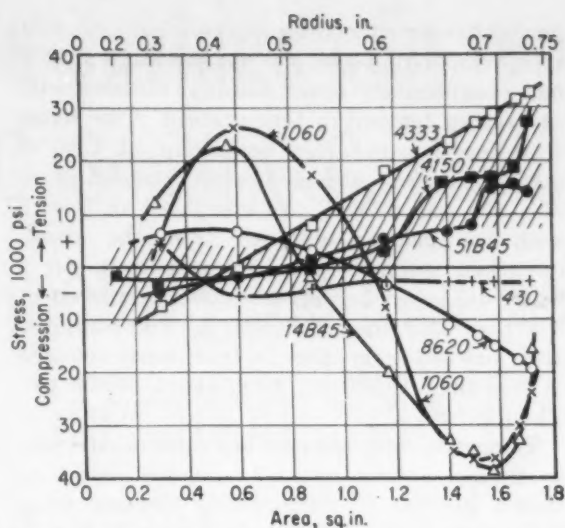


FIG. 3—Tangential stress patterns for 1.5 in. diam bars quenched in oil.

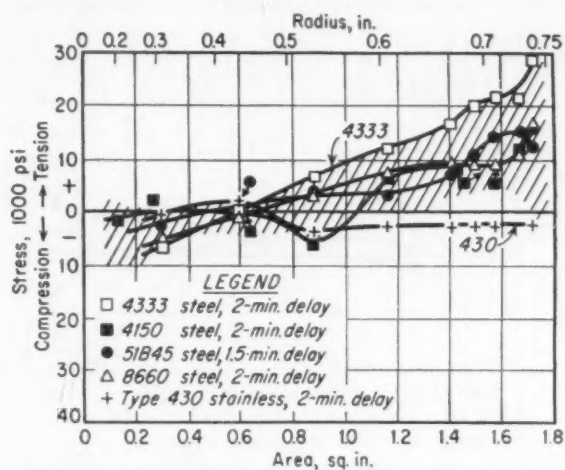


FIG. 4—Tangential stress patterns for 1.5 in. diam bars delay quenched in oil.

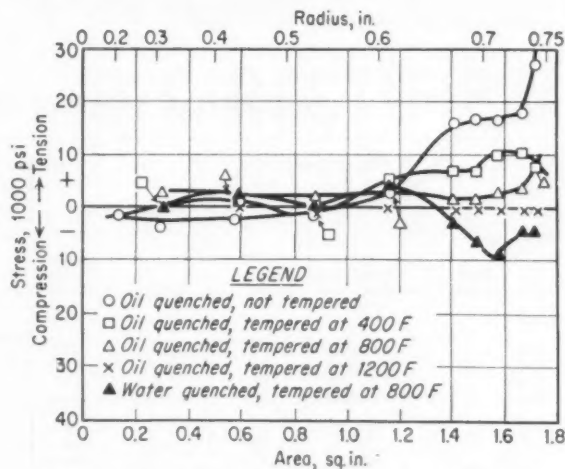


FIG. 5—Tangential stress patterns for 1.5 in. diam 4150 bars tempered as indicated.

Stress patterns were determined on bars of 4150, 8660, and 4333 steel after quenching and tempering. In each instance, the residual stresses were reduced as a result of the tem-

pering treatment. Oil-quenched bars of 4150 steel tempered at 200, 400, 600, 800, and 1200°F had progressively lower residual stresses with increasing tempering temperature. The stress was nearly zero after tempering at 1200°F. Stress patterns obtained after tempering at 400, 800 and 1200°F are compared in Fig. 5 with the pattern obtained from the as-oil-quenched specimen. The stress pattern for a water-quenched bar of 4150 steel tempered at 800°F is also shown in Fig. 5. The compressive stresses near the surface were reduced to less than 10,000 psi from about 90,000 psi, as-quenched.

Tempering also reduced the residual stresses in hardened bars of 4333 and 8660 steel as shown in Fig. 6. Compressive stresses were still present near the surface of the water-quenched bars, although they were reduced considerably from those obtained as-quenched. Tensile stresses were present near the surface

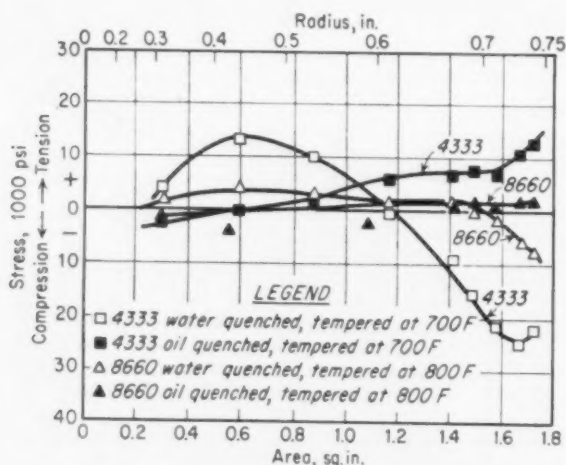


FIG. 6—Tangential stress patterns for 1.5 in. diam bars of 4333 and 8660 steels.

of the oil-quenched bars, but they too were reduced appreciably.

Stresses in the bars of 8660 steel were lower after tempering at 800°F than in the corresponding bars of 4333 steel after tempering at 700°F, because the original stresses were lower and a higher tempering temperature was used for the 8660 steel. However, the bars of 8660 steel were harder after tempering at 800°F than were the corresponding bars of 4333 steel after tempering at 700°F.

One 1.5-in. diam bar of 4340 steel was austenitized at 1550°F and quenched in molten salt at 400°F for 30 min to determine the effect of martempering on the stress pattern. Another bar of 4340 steel was austenitized at 1550°F, then quenched and held for 2 hr in molten salt at 625°F to obtain an austempered structure. The stress patterns resulting from these two treatments are compared in Fig. 7 with those for a direct-oil-quenched 4340 bar.

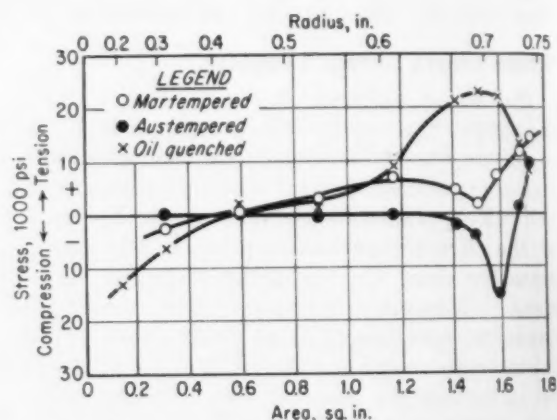


FIG. 7—Stress patterns for martempered, austempered, and oil-quenched 4340 sample bars.

TABLE II

TANGENTIAL STRESSES AND SURFACE HARDNESSES

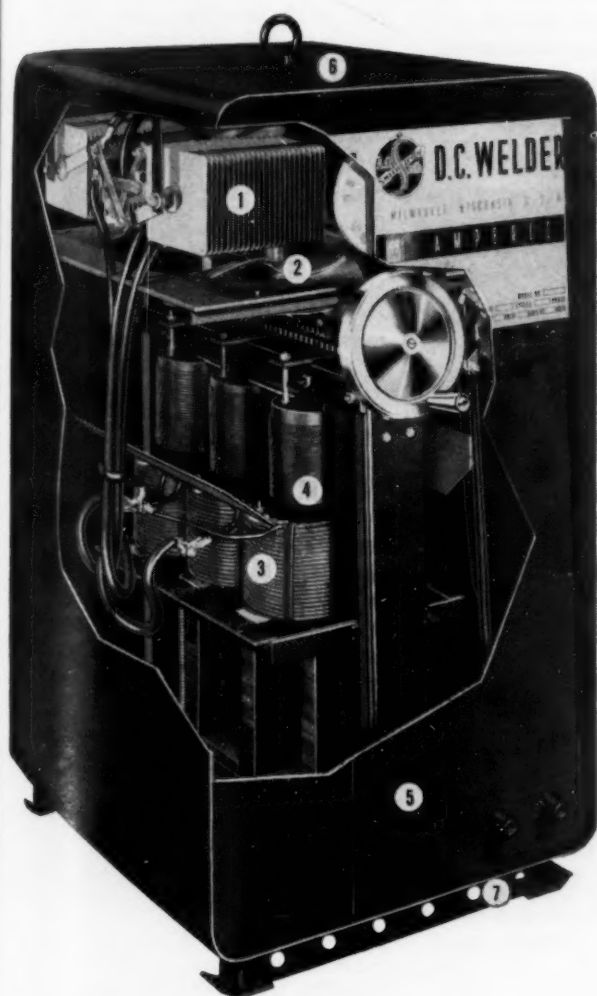
Steel Grade	Direct Water Quench		Direct Oil Quench				Delayed Oil Quench ¹			
	max. compressive stress,* psi	center hardness, Rc	Max. Stress**		surface stress,** psi	center hardness, Rc	Max. Stress**		surface stress,** psi	center hardness, Rc
			psi	location, in. from surface			psi	location, in. from surface		
1½-in.-Diam Bars										
4340	-110,000	57	+23,000	0.04	+9,000	56	+19,000	0.04	+14,000	55
51B45	-85,000	57	+15,000	0.02	+14,000	56	+15,000	0.04	+12,000	55
8660	-73,000	61					+17,000	surface	+17,000	61
150	-90,000	57	+27,000	surface	+27,000	56	+21,000	surface	+21,000	49
Cr-Mo-V										
4333	-99,000	54	+19,000	surface	+19,000	54	+9,000	0.04	+4,000	54
81B40	-93,000	53	+17,000	surface	+17,000	50	+5,000	0.02	0	50
8745	-95,000	58	+25,000	surface	+25,000	53	+21,000	surface	+21,000	54
1-in.-Diam Bars										
14B45	-98,000	30	-40,000	0.04	-15,000	23	-48,000	0.06	-28,000	23
1060	-65,000	38	-36,000	0.05	-24,000	29				
8620	-86,000	38	-19,000	surface	-19,000	27				
430	-17,000	12	-4,800	0.32	-2,000	10	-4,000	0.22	-2,000	10
1-in.-Diam Bars										
4340	-67,500*	57	+27,000	surface	+27,000	56				
4150	-54,500	60	+21,000	surface	+21,000	57				
8745			+16,000	surface	+16,000	59				

* Max. compressive stresses for water-quenched bars occurred at the surface except for 1-in. bar of 4340 steel with max. stress at 0.02 in. below surface.

** Stresses determined at 0.010 in. below surface designated as surface stresses.

¹ Air cooled two min. prior to quenching for all steels but 14B45, 51B45, 81B40, and Cr-Mo-V steels which were air cooled 1.5 min. prior to quenching.

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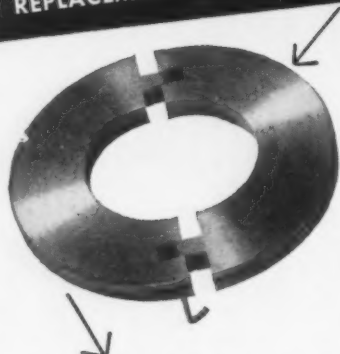
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Technical Briefs

Engineering

HYDRAULIC PUMPS:

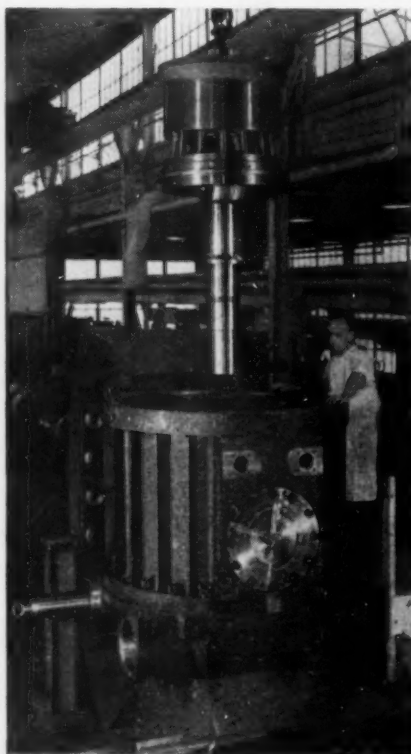
Weighing 20 tons apiece, pumps are among world's largest.

Two oil hydraulic pumps, said to be the largest of their type ever designed and manufactured, were recently completed for Tube Reducing Corp., Wallington, N. J.

Designed and constructed by Waterbury Tool Div. of Vickers, Inc., Waterbury, Conn., the pumps weigh over 20 tons each. They are of the high pressure, axial piston, variable displacement, reversible angle plate type. The E. W. Bliss Co. is constructing the tube reducer in which they will be used.

For Giant Tube Reducer

The pumps were designed for the drive system of the world's biggest tube reducer, now nearing completion. When completed, the giant machine will produce cold finished tubing, compression formed to size, shape and finish. It will process ingoing tubes ranging from 18 to 10 in. OD, reducing them to a 17 to 9 in. OD range.



ROTATING GROUP ASSEMBLY being lowered into case. Unit will be used in big new tube reducing machine.

IF YOU WANT MORE DATA

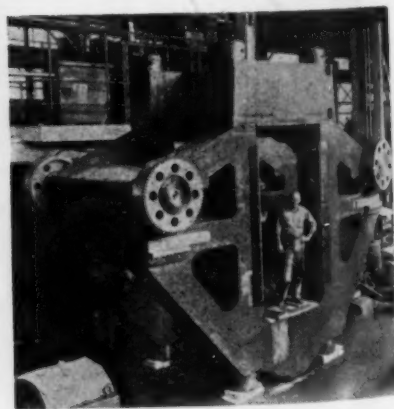
You may secure additional information on any item briefed in this section by using the reply card on page 143. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

The new pumps will operate the saddle—or roll housing—of the tube reducer through a pair of double acting hydraulic cylinders. Cylinder operation is coordinated by equalizing lines that assure proper oil flow between cylinders for variation of pressure. Each pump can deliver up to 2300 gpm of oil at pressures up to 3000 psi.

Fast Stroke Cycle

Completely assembled with rolls, roll neck bearings, etc., the total weight of the saddle is over 150 tons. The rolls contain a pair of insertable, taper-grooved dies that are rolled longitudinally over the stationary tube being cold-worked, thus sizing the tube to specified dimensions.

The hydraulic cylinders move the saddle back and forth over the tube for the die pass. Maximum travel of the die pass is 73 in. But the stroke length of a die pass may vary anywhere in the range of 73 to 24 in., depending on the reduction and structural shape specified for the tube.



SADDLE for the world's largest tube reducing machine will have a gross weight of 150 tons when fully assembled.

and Production Ideas

One stroke cycle—a complete back and forth movement of the saddle—is usually completed within two seconds of time, but may vary since speed is a function of stroke length.

Work conditions imposed on the Waterbury pumps can be likened to a locomotive engine having only enough track for moving 150 ton loaded freight cars a distance of 6 ft at the rate of 600 fpm, and moving the load back and forth at this speed from dead stop positions.

For the Navy

The 18-in. tube reducer is the larger one of a pair to be installed in a new naval-industrial facility. The Navy Bureau of Aeronautics will sponsor the facility, which will produce compression formed tubing in a new range of large diameter sizes for military and civilian items. The Tube Reducing Corp. will operate the facility.

Turbine Parts Start in Wood

Skilled patternmakers build wooden miniatures of steel turbine parts for testing under simulated conditions. The miniatures assist engineers to predict accurately the performance of the parts.

Karl Root, patternmaker, Foundry Dept., Turbine Div., General Electric Co. at Schenectady, N. Y., is shown making a model out of Honduras mahogany.



WOODEN MINIATURES of steel turbine parts are used by GE design engineers.
Turn Page

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The 5th Plate Will Be Filled

Statisticians estimate a U.S. population in 1975 of 190 million. They dramatize it in terms of the "fifth plate" to be at the dinner table now set for four.

At the present rate of production per acre, there is not enough good land in the U.S. to grow the additional food that will be needed. Most of it must come from greater yield and reduced spoilage. Soil erosion must be controlled, soil feeding increased. Insects and rodents must be attacked more vigorously. Crop storage must be improved.

To do these jobs, more and better "tools" such as farm machines, refrigeration and food processing equipment, power plants and others must be provided.

* * *

There is no doubt the American economic system will successfully meet this challenge. The history of this country has been one of abundant food supply, created by our use of tremendous numbers of "tools":

In 1910, using only 1,000 tractors and 24 million horses and mules, it took 30% of the working population to raise the nation's food.

In 1952, using over 4 million tractors (of a total of 24 million farm machines) and 5½ million horses and mules, 15% of the workers were able to produce more than enough food for all.

85% of the U.S. workers now do something other than raise food. They comprise only 5% of the world's working force, but they produce nearly half of all the comfort goods in the world.

Our economic system assures our ability not only to feed our growing population, but to provide it luxuries as well.

* * *

The "tools" to produce food must be made with industrial "tools". Among these is the contour-cutting band machine originated by The DoALL Company.



DoALL BAND MACHINES will handle hundreds of miscellaneous cutting jobs as well as production runs on identical parts.

The unique cutting tools used on these machines are narrow endless steel tapes which mount a great variety of cutting edges.

The machine was first used in tool rooms for cutting tool steel. It could often do in one hour, work requiring eight hours when done by previous methods. Soon it was used on production lines for making special shapes, parts, etc.

Its versatility was then applied to other materials, from aluminum to zinc, including plastics, wood, sponge, rubber, stacks of cloth, cardboard, glass, ceramics and brittle materials. Special bands are used for these applications.

Band machines are now used in more plants and more industries than any other machine tool. Data on band machines and band tools as well as on DoALL precision surface grinders, cutting tools, gage blocks and tool steel is available upon request. The DoALL Company, Des Plaines, Illinois.

DoALL

FREE ON REQUEST for your bulletin boards: 17" x 22" wall chart "Why Living Improves in America".



Weld "difficult" steels with little or no pre-heat!

use P&H LOW-HYDROGEN ELECTRODES

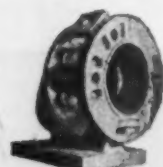
P&H has the industry's most complete line of low-hydrogen electrodes — many custom-built to match the chemical analysis or heat-treating properties of a variety of alloy steels. Being hydrogen-free, these electrodes eliminate underbead cracking — little or no pre-heat is needed to get high-strength welds on problem steels, steel castings, nickel-alloy steels, chrome-moly steels, .40 carbon castings, high-hardenable steels, aircraft and similar steels. There are other important advantages, too — for example, lower cost, compared to stainless-steel electrodes formerly used on many jobs. Ask your P&H representative or distributor for all the facts. Or write for bulletin 5-26.

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Chrome-moly header, typical of high-pressure, high-temperature applications.



Low-alloy casting, typical of applications where physical properties must be matched.

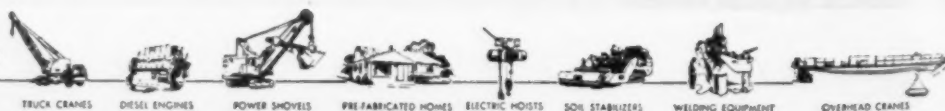


Alloy gear rim, typical application matching heat-treating properties of parent metal.



Excavator body, typical of heavy sections welded with P&H Low-Hydrogen Electrodes.

the **P&H Line**



TRUCK CRANES

DIESEL ENGINES

POWER SHOVELS

PRE-FABRICATED HOMES

ELECTRIC HOISTS

SOIL STABILIZERS

WELDING EQUIPMENT

OVERHEAD CRANES

TOOL SHARPENING:

Hob table stands still while grinding wheel reciprocates.

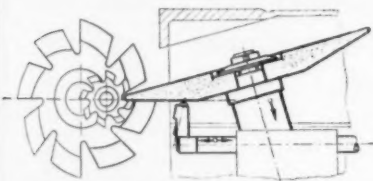
A method of sharpening gear cutting hobs, in which the hob table remains stationary while the grinding wheel reciprocates, has been incorporated in a European tool and cutter grinder. Accuracy of indexing is within ± 0.0001 in.

Hydraulically controlled and automatic in operation, the machine eliminates errors in positioning or indexing of the front rake, independently of the operator's skill or attention. The Klingelnberg GW 30 is distributed in the United States by Kurt Orban Co., Inc., New York.

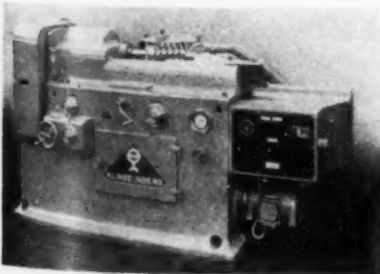
Prevents Excessive Grinding

Spiral lead is set by means of change gears, which prevent excessive grinding, in addition to assuring uniformity. Setting is done by swiveling the grinding wheel to the correct angle, as indicated on a graduated scale. For any lead, the effective cone generating line of the wheel passes through the hob axis. No special dressing is needed to obtain this result.

In the sharpening operation, both the reciprocation of the wheel



EFFECTIVE CONE generating line of grinding wheel passes through hob axis for any spiral lead setting on the tool and cutter grinder.



STATIONARY WORK TABLE, reciprocating grinding wheel and fully automatic hydraulically controlled operation are features of this Klingelnberg GW 30 for hob sharpener.

and the rotation of the hob are controlled by a single, hydraulically operated threaded spindle, a feature which assures conformity to the correct lead angle.

Hydraulically Controlled

Indexing of the hob from flute to flute is controlled by hydraulic pressure. During each reciprocating cycle of the wheel, the pressure forces the notch-flanks of an index plate firmly against a pair of pawls, which are placed opposite to each other to avoid back-lash. At the end of one cycle, the pawls are automatically retracted momentarily. The hydraulic pressure then rotates the index plate one step to bring the next flute into position.

Index plate is rigidly mounted on the same spindle as the hob. All intermediate moving parts have been eliminated. The index plate is hardened, and the flanks are specially shaped and hardened. Single-contact surfaces on the flanks, parallel to the axis of the index plate, mate accurately with the shape of the pawls.

Handles Spiral, Straight Flutes

Since the hob and its table do not reciprocate, inaccuracies often introduced by oscillating masses are largely eliminated. This advantage is particularly marked with large hobs.

A simple hand lever allows the machine to be changed over from spiral to straight flutes. Accessibility when changing hobs is increased because the grinding head of the machine operates sideways from the rear, rather than above the work piece. Because the table is vertically hung, the load and the grinding pressure are supported by the ways over a much shorter lever arm, doing away with any appreciable wear of the ways.

Grinding Limits

In addition to its use on hobs, the machine can be used for the sharpening of milling cutters and other types of cutters in which

Turn to Page 249

P & H

WELDING HEADQUARTERS

—that's where you find cost-cutting answers to welding problems

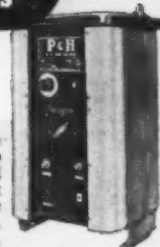
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P&H WELDING TWINS

P&H DC RECTIFIER WELDER



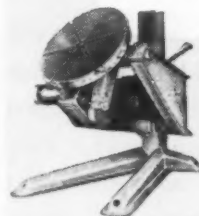
Right now — at the work — fingertip Dial-lectric Control gives you the heat you need. Three sizes, 200, 300, and 500 amps., NEMA rated.

P&H WN-301 Engine-Driven DC ARC WELDER



It's portable—weld anywhere, anytime. Dial-lectric Control gives you fingertip heat control at the work — for faster, better welding. Runs at only 1750 rpm. Welding service range, 60-375 amps., NEMA rated.

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ACP metal protective chemicals include: protective coating chemicals for steel, zinc and aluminum; metal cleaners and rust removers; final rinse controls; pickling acid inhibitors; copper coating chemicals; soldering fluxes; alkali cleaners and addition agents; copper stripping and brightening solutions.

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SALUTE TO THE SOUTH

—Your Industrial Market



WHY THIS SPECIAL STUDY?

The South is one of the fastest growing areas in the United States. We want you to read why we believe so firmly in the industrial potential of the new South . . .

How Deep Are the Roots of the Southern Boom?



AUTHOR Tom Campbell wanted no Northern ivory tower stories on Southern growth. To get the facts as they really are, he toured the South extensively, interviewing Southern businessmen, researchers, editors and labor leaders.

Southeast in these reports includes Alabama, North and South Carolina, Florida, Georgia, Kentucky, Louisiana, Mississippi, Tennessee, Virginia.

Industrialization of the South began long before the area was regarded as a fast growing market . . . Diversification started with tobacco, furniture, textiles . . . Then machinery manufacturers moved in to supply the equipment needed by these industries.

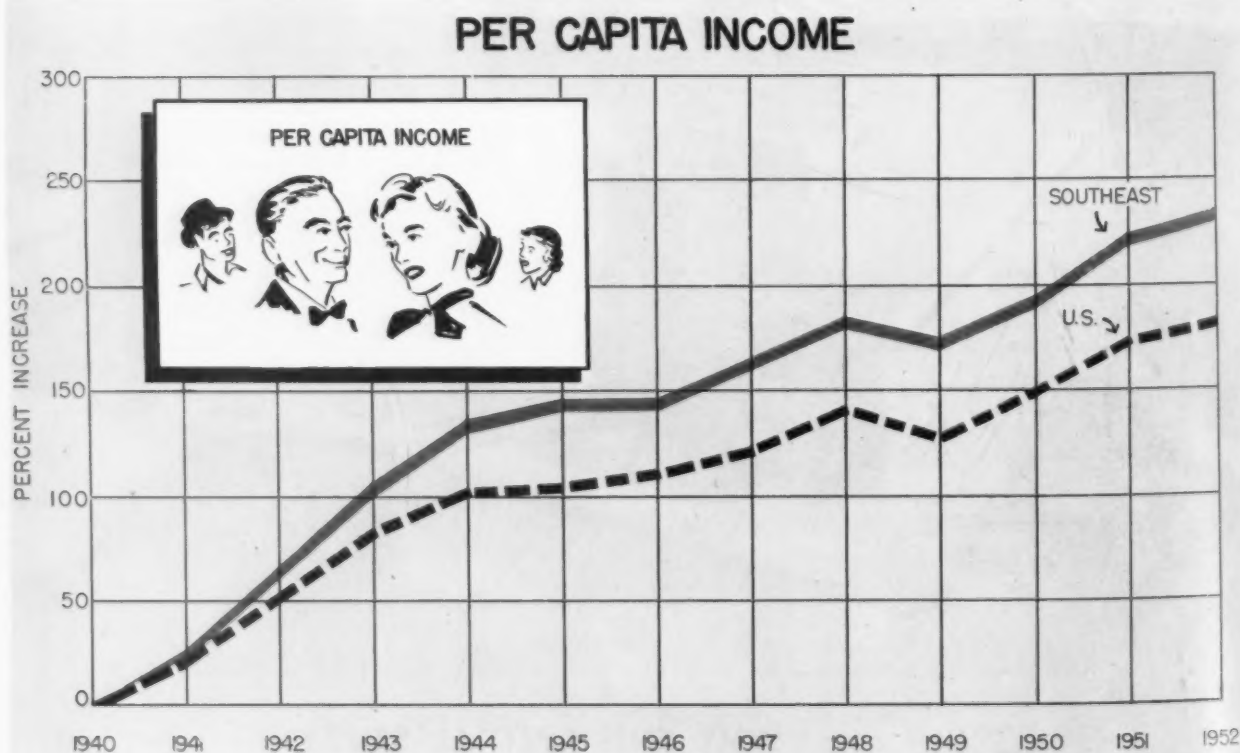
By Tom Campbell, Editor

THE MASON-DIXON LINE is an heirloom which some people still cling to—and has been for a long time. It goes well in songs, and stories. But it had nothing to do with the awakening of our industrial giant in the Southeast.

Industrially and economically there is no longer any basic difference between the South and the rest of the country—unless it's that the Southeast is rapidly

"catching up." The so-called Northerner and Southerner are found mostly in the movies and historical novels and in the minds of those who never got out of their own backyard.

There is no longer any "cheap" labor in the South. There is a surplus of intelligent labor; labor that can be trained and which is providing manufacturers with an ever increasing consumer market.



Like countries all over the globe that depended too much on one industry, the Southeast started years ago to diversify its products and services. Then the trend snowballed. And it is now rolling at top speed.

While the South was depending on cotton, the North was industrializing. As long as Southerners had hired hands, raised cotton and could spend most of their time as country squires, there appeared to be little need for industrialization.

Fifty years ago, far-seeing Southerners knew that diversification was due to come to the South sometime. Tradition slowed this trend for many years, but the South had everything to support a diversified economy: raw materials, manpower and potential markets.

Had Eggs in Four Baskets

When the industrial bug started to bite the South in earnest many years ago, most of its eggs were in four baskets. Low-skilled, low-paid industries started the ball rolling. Activity centered on tobacco, furniture, woodworking, and textiles.

In the beginning there were: low wages, poor working conditions, free pollution rights and blue-sky promises for the future. Cities and hamlets climbed all over each other trying to get industry to their locale.

But this practice was nothing new. Other areas did the same thing when they began their industrialization. The increased activity, movement of factories and gainful employment of workers started a tremendous Southern market potential on its way.

Move to Consumers

The second wave of incentive started when people serving the basic plants also went South to be near their consumers. Tobacco machinery makers moved to the tobacco men. Textile machinery manufacturers followed the textile

makers. Those supplying tools and other materials to furniture and woodworking plants moved closer to the source.

This activity was going on slowly—and quietly—long before the Southeast was known to have become one of the fastest growing markets in the U. S. But there were deep roots to the phenomenal growth of the Southeast. The flower was about to show its bloom.

What's Behind the Boom?

What are some of the lesser emphasized proofs that the South's growth is not a flash? Here are a few of the more important ones gained from interviews with thoughtful Southerners:

☛ Returning soldiers of World War I came back home and wanted something better (or more of it). This change in habits and desires was repeated after World War II and is going on today.

☛ Southerners got tired of watching people from other parts of the country come to their area and make a big thing out of new plants. They wanted to get in the act. They did.

☛ Gains in mechanized agriculture freed workers for industry. The farmers made more money; so did the workers who went to industry. The result was a tremen-

dous gain in living standards.

☛ The Southeast is becoming one of the biggest consumers of products made in the South. Thanks to advertising, utilities, new machinery, chemicals and air conditioning, the expansion has been given an added boost.

☛ Eastward expansion of oil fields holds another plus for Southern industry. What oil money did for Texas is now being done for Louisiana and will do for other Gulf states.

☛ More Southern workers are staying in the South. More Southern students are finding jobs there instead of migrating to other parts of the country. That means a greater population growth.

☛ The race problem is still with the South but it is not as burning an issue as some would have us believe. Negroes in the South are big consumers of electric refrigerators, television sets and cars. They are a big factor in the growth of the South.

☛ When the South counts the cost of educating the Negro only to see him migrate elsewhere it will eventually change its attitude. The change will come slowly but it will come.

Other signposts of growth:

☛ More time and effort are going into anti-pollution studies and laws. No longer is pollution accepted just to get a plant into a location.

☛ More attention is being paid to road-building, expansion of roads and better maintenance.

☛ Research is advancing with more and more of it including metals and metalworking projects.

☛ There is still a more leisurely pace in the South. With air conditioning easily available more Northerners are migrating to the South.

The roots of the Southern boom are deep. They are going deeper. For visual proof and more specific detail on some aspects of the Southern market you have only to read on from here.

PER CAPITA INCOME U. S. AND SOUTHEAST

YEAR	U. S.	SOUTHEAST
1940	\$ 575	\$ 322
1941	693	404
1942	876	539
1943	1,059	673
1944	1,160	768
1945	1,191	803
1946	1,211	803
1947	1,293	851
1948	1,303	920
1949	1,325	884
1950	1,440	960
1951	1,501	1,077
1952	1,639	1,121

Southeast figures are for 11 states.

How Far Along is Industrial Development of the South?

Despite the torrent of new plants and new industries in the South since World War II, there is still room for many more . . . It has the markets, the labor, the power to support even more intense industrialization.

By Fred L. Allen,
Southern Correspondent
for The Iron Age

NOT TOO LONG AGO it was the "Agricultural South." Today, more and more, we hear about the "Industrial South." Agriculture has not lost its importance by any means, but industry is pushing it for first place in the economy of most sections.

Industrial growth of the South was gradual but steady—except during the depression years—before World War II. Then it speeded up under the impetus of war necessity.

Its most rapid and important advances, however, have been since the end of the war. In this period it has grown faster, perhaps, than any other section of the country, with hundreds of millions—perhaps billions—of dollars being spent by private industry for new plants and equipment, and expansion of existing facilities.

Eye South's Markets

Almost every day there is an announcement about one or more new factories being put up in the 10-state area of Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, Tennessee and Kentucky. And more are scheduled for the future.

Major corporations of the North, East and Midwest, interested in decentralization and with an eye on the South's vast markets, are studying and surveying the area's possi-

bilities. Some have already purchased or leased land on which they plan to build plants in the near future. Still others are establishing warehouses and sales offices on sites with sufficient land nearby for construction of a factory.

War Money Poured In

World War II was the principal factor in bringing about this industrial growth. The South was selected by the Roosevelt Administration for many big defense projects. The government built plants and let private industry operate them. In addition, Southern mills and plants received hundreds of millions of dollars in defense orders.

After the war, Southern plants reconverted from defense work. With the huge profits made during the war years, and with plenty of money available from private concerns and government agencies, obsolete machinery was replaced and plants were expanded. Many of the projects built by the government were leased to private manufacturers.

Then large corporations began decentralization programs. Many of them picked the South for their branch plant operations.

Research Pushes Textiles

Despite the many and varied industries in the South, textiles still predominate, and will continue to do



BORN in Birmingham, Fred Allen, Iron Age's Southern correspondent, has spent his life as a reporter and editor on several Southern newspapers. He also does a great deal of writing about industry in the South for other business magazines.

so for some time, for this industry, too, has expanded as new uses for textiles have been developed by researchers.

Modern machinery has been installed and no longer does the South serve merely as a supplier of yarns and fabrics for Northern finishing mills. Instead, cotton is now grown, spun, dyed and made into finished products in a single state, sometimes in a single county. When synthetics threatened to displace cotton, textile researchers turned them into an asset by finding a way to blend them with cotton.

Industry Is Varied

Southern industries have become so diversified and vary so much from state to state that it is almost impossible to rank them in order of importance. Steel and iron production and metalworking, rated right along with cotton in Alabama and high on the list in Georgia and Tennessee, are of little importance in Florida and Louisiana.

Oil and gas, important in Mississippi and Louisiana, are not even on the list as yet in Georgia and the Carolinas.

Industries that rate high in importance in one or more states are:

Industry is crowding agriculture for the top spot in the South's economy . . .

chemicals, lumbering, citrus fruit, synthetics, shipbuilding, naval stores, aluminum manufacturing, tobacco, cigar and cigarette-making.

The chemical industry, aided by the government, is growing impressively. The Tennessee Valley Authority is an important producer of chemicals, as are the atomic energy plants and the Redstone Arsenal Guided Missile Center, formerly a chemical warfare installation in World War II. Fort McClellan, Ala., will soon become an Army Chemical Corps training center.

Discovery of a huge salt dome near McIntosh, Ala., has resulted in establishment of three large chemical plants and a rayon plant in that area in the last 2 years. Practically every Southern state has its chemical plants just as it has its metalworking plants. The chemical industry undoubtedly ranks close to the top of the list in importance.

Metalworking Booms

Metalworking plants have more than doubled in the South in little more than a decade, seem destined to continue growing. And increased production capacity added by Southern steel and iron mills in the last 3 years means there is more raw material available for metal products.

Much of the growth in metalworking resulted from war and defense needs. The demand for shells during World War II was insatiable. It grew again with the start of Korea and has continued while the government builds up its far-flung stockpiles.

Plants started during World War II to manufacture shells have, for the most part, continued in metalworking. So have many that were converted from other types of manufacture.

Although started by a Democratic administration, support of these plants is being continued by the Republicans. The same is true for textiles, woodworking, ship building and other industries.

Some electronics plants have been established in the South in the last few years, but they have not yet become an important factor in the economy. More are expected, however.

Atomic energy is also growing in importance. In addition to government plants, research in atomic energy for industrial and other peacetime uses is being carried on by research laboratories, public utilities.

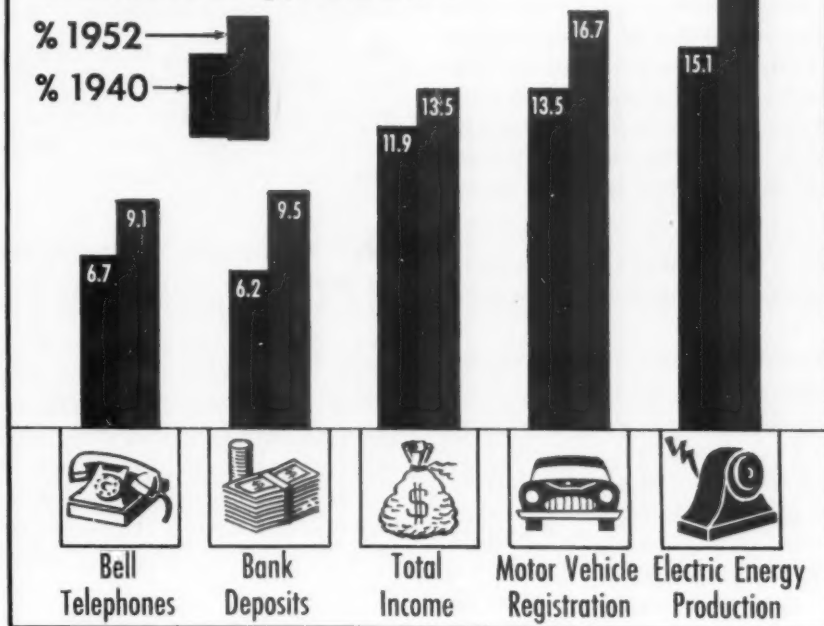
Aluminum manufacturing is another fast developing Southern industry. Aluminum Co. of America and Reynolds Metals Co. have enlarged their operations considerably in recent years, and last year Kaiser Aluminum Co. began op-

go into electric refrigerators, but it does not make the finished product, or at least not in quantity. (General Electric Co. has moved its Major Appliance Div. to Louisville.)

Nor does the South make electric washing machines, dryers, many kinds of machinery, diesel and steam engines, and a lot of other end items.

So there are abundant opportunities for many types of industries to locate in the South. It has sites at reasonable prices, close to waterways and with excellent transportation facilities. It has the electric power needed by industry and has abundant, though no longer cheap labor.

Southeast's Share of U.S. Industry, Wealth



erating its New Orleans plant.

Despite the many new plants established in the South in the last few years, there is room for a lot more. The South makes the steel, aluminum, rubber, seat covers and parts that go into automobiles, but it does not make the car. It manufactures radio tubes, but it does not make radios or television sets. It produces the raw materials that

Taxes are as low or lower than in other industrial areas. It has excellent colleges to supply the technical and scientific knowledge needed by industry. Housing is good and is being expanded. The people are friendly and helpful and have sufficient wealth to be a good market. That's why the South has issued a standing invitation for more industry.

Research is Surging in the South

Interest in industrial and scientific research, long neglected by the South, is rapidly mounting as that area tries to find better uses for its resources . . . To get a first-hand account of the South's research progress, IRON AGE'S southern correspondent quizzed T. W. Martin, organizer of Southern Research Institute.

Q. What caused you to become concerned about research in the South?

A. I have long been interested in research, particularly industrial research. While studying the question of industry and patents in the late 1920's and early 1930's, I realized how important research is. I felt the South should become more research conscious—that what research had meant to the nation, it should mean to the South. And I thought that with its own research laboratory, the South would find uses for the resources that were going to waste.

Q. Was it hard to get southern firms interested in the project?

A. Some firms, yes. I traveled from Texas to Louisiana—throughout the South—presenting the idea, talking to business and civic groups, company executives and individuals. Some people were immediately interested, while others held back. But I received encouragement and support from many sources.

Although I planted the idea in the minds of many, Southern Research Institute could never have been established without the whole-hearted support and assistance of a lot of people.

Q. Are you satisfied that Southern Research is on the right path and is expanding as it should?

A. There's no question about it. The Institute is only 8½ years old, yet it has been forced to expand several times. And from two employees at the start, the staff has grown to nearly 150. We look for still further expansion both in facilities and personnel.

Q. How many laboratories are available in the South?

A. I believe more than 100 have been established in the Southeast by industry, colleges, government installations and private institutions like Southern Research.

Q. Where does the South get its scientists?

A. Most of the scientists with Ph.D. degrees come from the North and Middle West because there are only three or four colleges in the South that give this degree. But more scientists with bachelor and master degrees come from the South than any other section.

Q. Has the exodus of new graduate scientists to the North been stopped?

A. It has not been stopped, but it has been greatly slowed.

Q. Do you think Southern industry can meet Northern competition for research workers?



ORGANIZER and chairman of Southern Research Institute, Thomas Martin is one of the pioneer promoters of southern research. As chairman of the Alabama Power Co. he has also done much to bring new industry into the state.

A. Yes, indeed. Statistics show that salaries paid new college graduates in the South are nearly on a par with all other sections of the country, and more than in some areas.

Q. What else has the South to offer to keep more of its own graduate students from going to the North?

A. The South has everything to offer that the North has. And new developments with southern raw materials are a constant challenge to the scientist. Don't forget that much of the nuclear research is being carried on in the South and a great deal of work is being done with synthetics.

Q. What advantages does the South have to draw Northern graduates to its plants and laboratories?

A. I would say climate and general living conditions are the greatest attractions of the South. Then, too, the field is not crowded.

Q. Do you think the South will do pure research as well as commercial and industrial studies?

A. The South already is working on pure research. Isn't the study of cancer and virus cures pure research? Southern Research Institute is doing that, and so are many southern colleges. A new five-story building now under construction at Southern Research will be devoted entirely to cancer research.

Q. Could you list in order of importance the various projects Southern Research Institute has worked on?

A. We consider all projects important and challenging. The way I might rank them might not be the way others would. Then, too, all of the research is sponsored and information on many projects—which might well be the more important ones—has not been released by the sponsors.

The Institute has entered many fields. Great strides have been made in the chemotherapy of leukemia and in studies of various anti-cancer agents.

Q. What has the Institute done in the field of industrial research?

A. For the American Iron and Steel Institute research has been done on the behavior of zirconium and titanium in steels, with special emphasis on the advantages of using these elements as substitutes for the normal portions of manganese content.

Research was conducted in nodular graphite cast iron for the Malleable Founders Society. And marked improvement has been achieved in the machinability of high-phosphorus cast iron in a project sponsored by Woodward Iron Co., Birmingham. Instead of attempting to remove the phosphorus, an alloy treatment is given the iron to change its internal structure.

Q. Who do you think will carry on the Research Institute's work?

A. There are 30 trustees of the Institute in addition to Dr. William M. Murray, its director. All these men are cooperating to improve the Institute's service, not only for the South, but for all of mankind.

Q. Who were your early helpers in establishing the movement?

A. The late Robert Strickland of Atlanta, president of the Trust Company of Georgia, was one of the most enthusiastic helpers.

Others who worked actively on the project included Fitzgerald Hall of Nashville, Tenn., president of the Nashville, Chattanooga & St. Louis Railroad Co.; E. A. Roberts of Mobile, Ala., chairman of the board of Waterman Steamship Co.; and J. Finley McRae, president of the Merchants National Bank of Mobile.

Q. Did any other transportation companies help you?

A. Yes, quite a few. There was Ernest E. Norris, then president of the Southern Railway System; Wayne Johnson, president of the Illinois Central Railroad Co.; the late James B. Hill, then president of the Louisville & Nashville Railroad, and many others.

Dr. Edward R. Weidlein, one of America's great scientists and director of the Mellon Institute, was my guide at the beginning. And I received much assistance and guidance from Charles F. Kettering Foundation. Dr. W. H. Lazier was the Institute's first director.

Will the South Be Booming in 1963?

More than 3000 multi-million dollar manufacturing plants will be built in the South during the next 10 years, estimates Southern Assn. of Science & Industry. Metalworking will have an important share in this expansion:

(1) There will be 75 more major steel fabricating plants, 25 more foundry installations, 100 new machinery plants, 60 more electric and electronic equipment plants.

(2) Nonferrous industry will add 20 important plants; there will be 15 more aircraft and missile factories; 10 more atomic energy plants.

Other important developments:

- ▶ The South will need 10,000 more scientists.
- ▶ 1000 research laboratories will be built.
- ▶ 200 large plants will be erected to manufacture products not yet developed.

Spot Checking Metalworking in the South

Metalworking is growing rapidly in the South . . . Spot check shows expansion in next 5 years will be substantial . . . Study indicates that 27 pct of firms surveyed will bring out new products.

SSPOT CHECK by THE IRON AGE of a sample group of metalworking plants in the Southeast provided enough specific information to predict that:

☐ Plant expansion among these companies will keep ahead of the trend for the U. S. as a whole.

☐ The gain in the number of employees will be substantial if increases over the past few years are valid indicators.

☐ A flock of new products will be added to lines already handled by close to 30 pct of the metalworking firms studied.

☐ Metalworking in the Southeast will have a greater share of the market within the near future.

These are only a few general con-

By Tom Campbell, Editor

clusions based on a study of 199 metalworking plants. This spot check was made of a cross-section of plants in 10 southeastern states. Plants surveyed were well balanced with regard to number of employees, total sales, and type of products or services offered by the companies.

The study is representative of the South because 88 pct of the 199 replies were from main plants, not branch subsidiaries. About 36 pct of the plants studied have been in business for 13 years or less; 17

pct, 14 to 25 years; 25 pct, 26 to 49 years; while 22 pct have been in business for 50 years or more.

Between 1940 and 1950, sales of 106 reporting plants increased 205 pct. The increase in 1953 over 1940 for these firms amounted to 283 pct. Total sales figures for the 106 plants were: \$53 million in 1940; \$162 million in 1950; and \$203 million in 1953.

Sixty firms did not report figures for 1940 but their sales totals for 1953 were 37 pct ahead of 1950 totals. This sample of the Southern metalworking industry closely matches the better than average growth reported for almost all Southeastern industries.

Increase in the number of workers in the metalworking plant study since 1940 is phenomenal:

Twenty-seven plants increased the number of their workers 301 to 700 pct from 1940 to 1953.

Fifty-eight plants showed a gain ranging from 51 to 300 pct.

Twenty-three plants showed a gain in number of workers ranging from 1 to 50 pct.

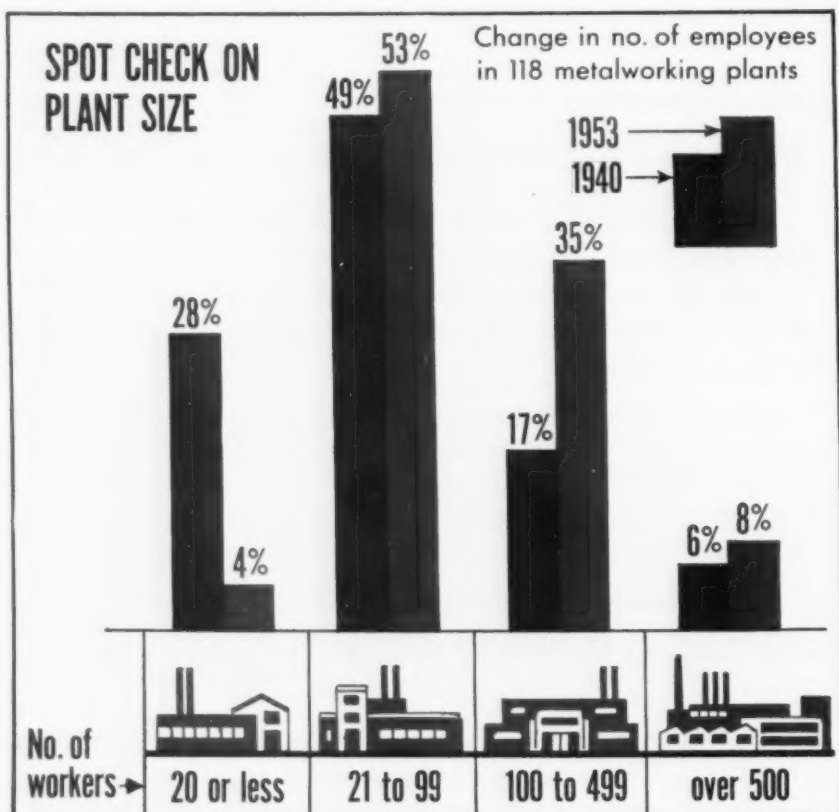
Six plants showed no change from 1940 to 1953.

Only 4 plants showed a decrease in the number of employees.

A more striking sample of what has happened in Southern metalworking plants shows up when the improvement is figured on a worker bracket basis. Here is the way the picture looks in 1953 compared to 1940 for 118 plants:

☐ 28 pct of the plants had 20 workers or less in 1940. In 1953 only 4 pct of the plants were in that category.

☐ 49 pct of the metalworking plants had 21 to 99 workers in 1940; 53 pct had that number in 1953.



South's metalworkers will spend \$200 million on expansion in next 5 years . . .

17 pct of the plants had between 100 and 499 workers in 1940; 35 pct fell in that range in 1953. 6 pct of the plants had more than 500 workers in 1940, compared with 8 pct in 1953.

Most Southern metalworking manufacturers have made up their minds about expansion during the next 5 years. Their survey replies show that:

Fifty-seven pct will spend money on expansion; 22 pct are undecided; 14 pct will not invest in expansion; 7 pct, no answer.

How Much for Expansion

For the 113 plants which stated how much they intend to spend on expansion, the grand total amounted to more than \$49 million. A reasonable estimate of the total outlay for expansion during the next 5 years, based on the known number of metalworking plants, places the expenditure figure around the \$200 million mark.

Firms included in the study were also fairly definite about their plans to bring out new products during the next 5 years. The survey showed that:

Twenty-seven pct will introduce new products or add new services within the next 5 years.

Fourteen pct were undecided.

Forty-eight pct did not expect to add new products.

Eleven pct gave no answer.

Move Nearer Customers

Results of this IRON AGE spot check of Southern metalworking come as no surprise to those who have been watching this industry for the past few years. It confirms their belief that metal production and fabrication is only getting started.

Time and again interviews showed that suppliers to basic industries in the South have moved or were planning to move closer to their customers. An example of a simple shift is the case of screw manufacturers moving South to be near furniture makers.

Both steelmaking and steel fabrication have been expanded in the South. Even more development is slated for the next few years. And Northern mills, hoping to get a slice of the increased business in the South, are opening new warehouses there.

Market researchers are intensifying their studies of metal uses in the South. Applications are often different from other regions but they nevertheless involve large quantities of metal.

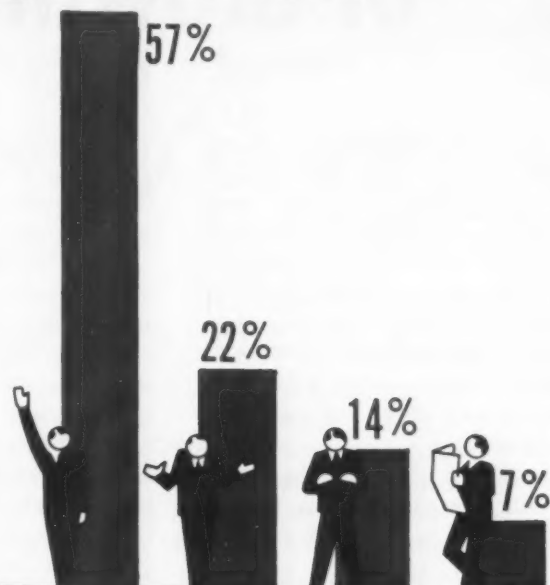
What They Will Make

As an eye-opener here are a few of the new products Southern manufacturers will bring out during the next 5 years: truck-type refrigeration, shell-molded castings, extrusion equipment for waste wood, water heaters, room air-conditioners, woodworking machines.

A few more to come are: barbecue machines, extruded aluminum tubes, carbide tipped woodworking tools, cold-rolled sheets, leaf springs, concrete mixers.

SPOT CHECK ON EXPANSION

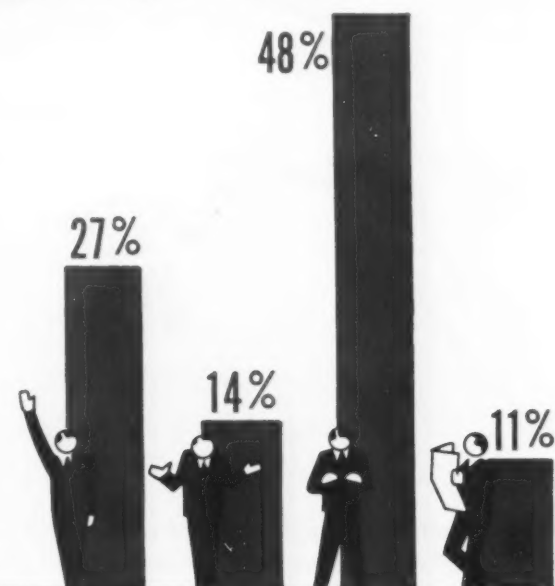
Q Will you expand your plant during next 5 years?



A Yes Undecided No No Answer

SPOT CHECK ON NEW PRODUCTS

Q Will you bring out new products during next 5 years?



A Yes Undecided No No Answer

Sensitive Indicators of Growth in the South

MANY PEOPLE complain that charts based on percentages are misleading, particularly if they show growth from a relatively low starting point. The sensitive indicator charts on these pages do start from a low base, but they are important because they compare the South's dramatic development with both the U. S. as a whole and the South of a few years ago.

The growth of the Southeast has been phenomenal and has been a surprise even to Southerners. It is

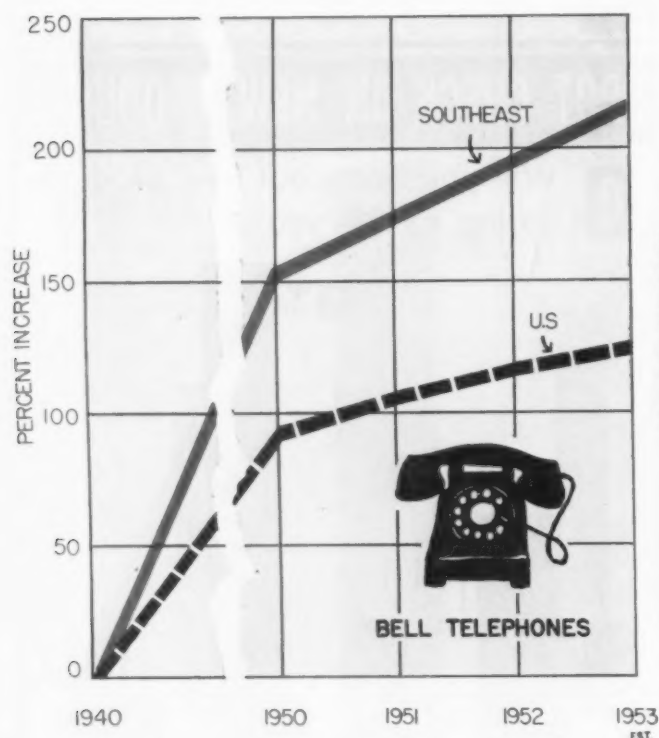
almost as though a giant had awakened and is now taking advantage of all that has been discovered while he was asleep.

Take the telephone chart below. What it doesn't show is that not too many years ago about one Negro family in ten had a phone. Today more than 50 pct of the Negro families in many areas have phones.

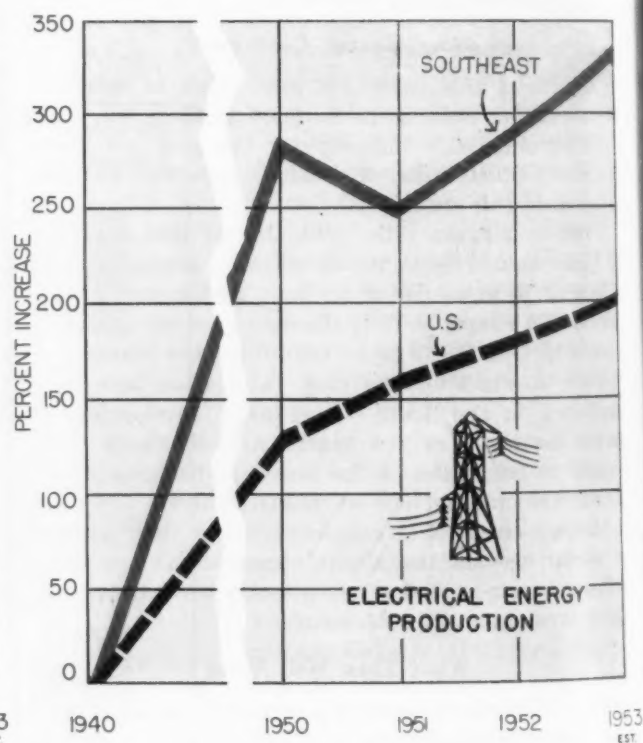
When you think of phones you have to recall the kind of products that go into telephone equipment, the employment involved and the

potential built by the use of phones as means of selling. The same thinking applies to electrical energy output, motor vehicle ownership—all are sensitive to purchasing power of people and companies.

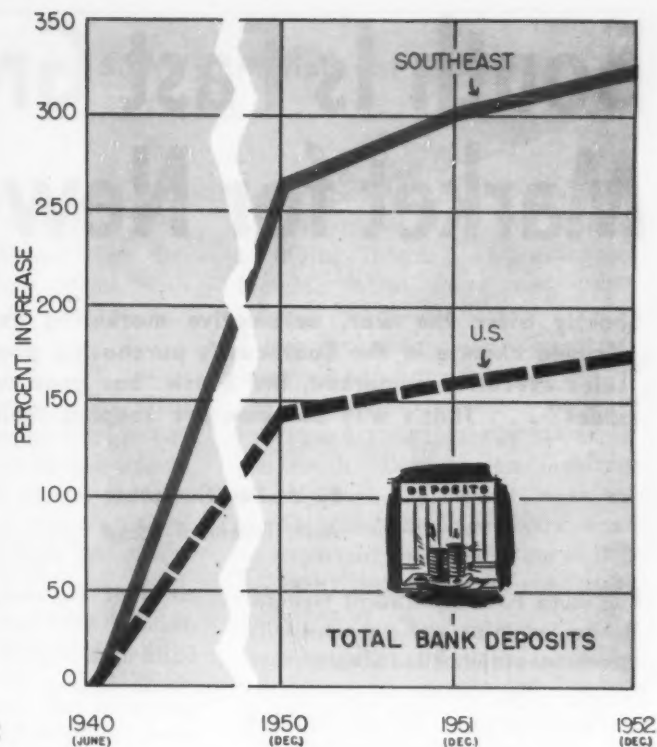
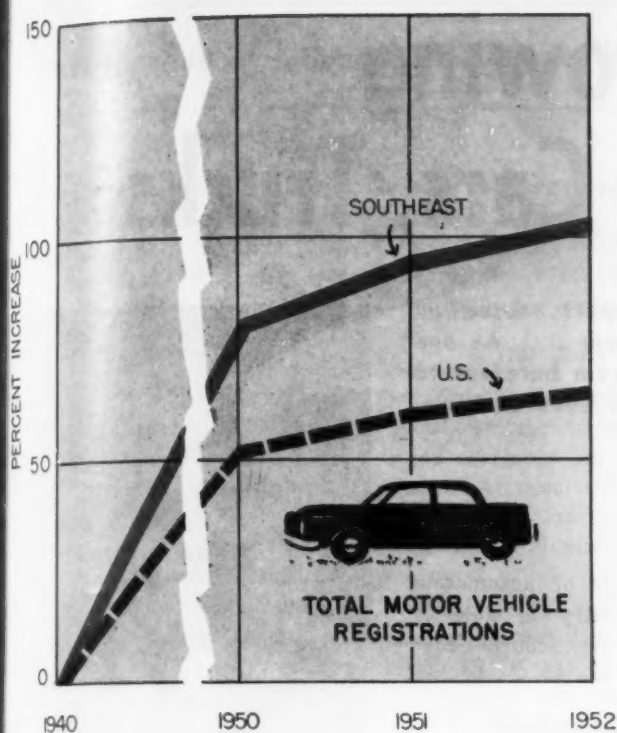
It is true that in many respects the Southern indexes are at the bottom of the list. But they are coming up fast. At the rate of growth indicated, it won't be too many years until Southeastern averages compare favorably with those for the country as a whole.



A HIGH standard of living is indicated by the telephones in any area. Past estimates by telephone people fell far short of demand in the South. But in the next 10 years telephone people look for an additional growth amounting to some 50 pct above the present level.

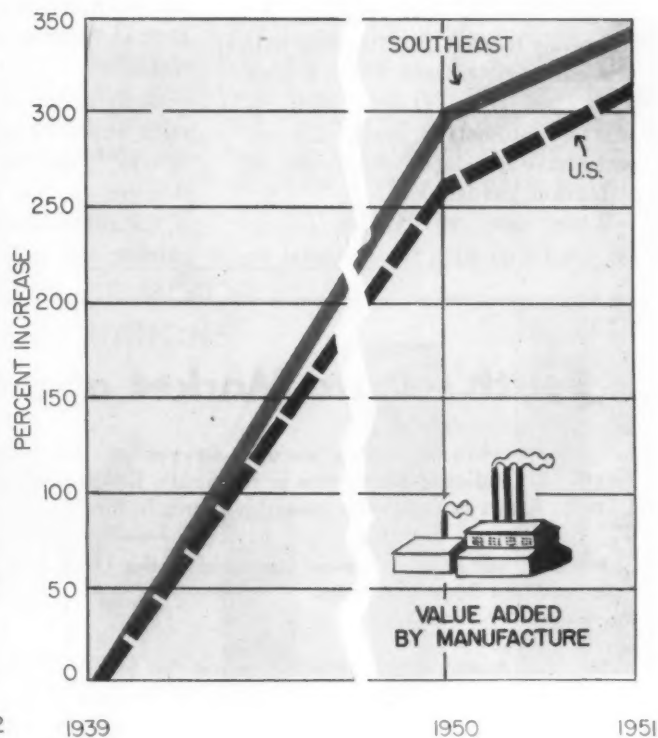
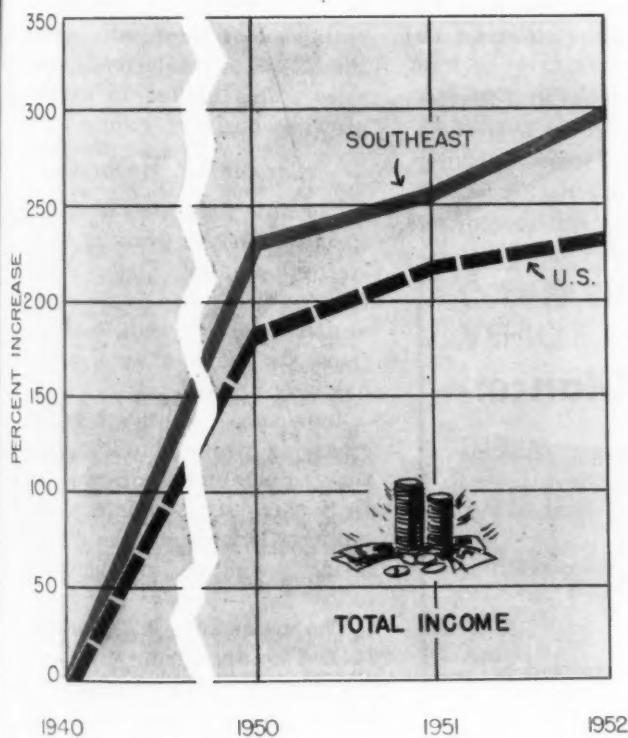


ELECTRICAL ENERGY is a key to industrial expansion. In the South output has increased phenomenally since 1940. Even more striking is percentage of output in the South to the nation as a whole. This year the figure is expected to be about 21.5 pct of the U. S. total.



WHEN YOU think of all the purchases automobile and truck ownership generate you are on the way to sensing potential. In 1940 the Southeast had 13.5 pct of U. S. motor vehicles but by 1952 it had 16.6 pct of the total. The South is the third fastest growing auto market.

EVERYBODY KNOWS that money is nothing but a medium of exchange for work done. Bank deposits show an amazing increase in the South since 1940. Deposits in the Southeast in 1940 were 6.2 pct of the U. S. total. Today they account for 9.5 pct of the total.



NO MATTER how you look at it—total income or per capita income—these figures show better than anything else how far the "industrial revolution" has progressed in the Southeast. Amazing when you consider that the area had a textile slump in 1952 and early in 1953!

THEY SAY that "value added to manufacture" is a good index of the way business is going in certain areas. This chart shows that the Southeast has kept pace with the U. S. since 1950, went ahead in 1951. According to reports it will continue the above-normal improvement.

South Is Fast Growing Market for New Cars, Trucks

Shortly after the war, automotive marketing experts noted a striking change in the Southeast's purchasing power . . . As one sales executive remarked, the South "has gone from barefeet to shoes" . . . That's why automen are keeping their eyes on Dixie.

By Walter G. Patton,
Asst. Technical Editor

CHARLES F. KETTERING of General Motors explains the phenomenally successful automobile industry very simply: "We operate on the double profits system. If we can continue to build a product that's worth more to the customer than the money he has in his pocket, he'll buy our cars and give us his money. That will mean a profit for both of us—that's the double profit system."

Mr. Kettering could have added that the auto industry also has a unique system for finding out where its market is. Starting with new car registrations which it compiles, analyzes, charts and re-charts, automotive marketing experts have developed their own set of market yardsticks.

When new registration figures are combined with the financial re-

ports of thousands of automobile dealers, the industry is able to build up a remarkably accurate economic picture of the U. S.

Detroit's Indicators

These automotive indexes, according to the Detroit experts, are much more sensitive than bank clearings, car loadings, steel operating rates or other statistics used by economists. Consistent accuracy of the automobile industry's postwar market estimates indicates the Detroit marketing men may be right.

Early in the postwar era, Detroit sales analysts, in going over their figures, spotted some striking changes in the purchasing power of the southeastern states. Moving quickly, the industry built new as-



WALTER PATTON, one of the nation's outstanding authorities on the automotive industry, interviewed many top automen in preparing his up-to-the-minute story on the South's expanding car market.

sembly plants and parts depots in the South, established regional sales offices staffed to handle the growing business volume.

Car Market Mushrooms

The auto industry's move to cash in on the South's growing economic strength paid off. Since 1940, when the Southeast had 13.5 pct of the nation's motor vehicle registrations, its share of auto ownership has risen to 16.7 pct.

Importance of the 3.2 pct increase is pointed up by the fact that total number of cars in the U. S. this year is estimated at 54.7 million. This means the South has about 9 million of the nation's autos.

The major auto sales gains made in the South during the postwar years were in the high price categories. Next largest increase was in the medium price class. Although these trends held true for all parts of the U. S., they were particularly marked in the South.

According to a sales analyst of one of the big auto firms, the mar-

South's Auto Market at a Glance:

Automotive industry's careful surveys of the nation's economic strength indicate resurgence in the South. Key trends that have caused automakers to build new assembly plants in the South in recent years:

- One out of every seven cars sold in the U. S. is now marketed in one of ten Southern states.
- New motor vehicle registrations in the South in 1947 totaled 631,635. Average of registrations from 1950 through 1952 was 978,991.
- Before the war, low-priced cars accounted for 65 to 70 pct of automotive sales. Now, despite marked price increases, only 55 to 60 pct of car sales are in the low-cost category.

Increased industrialization is main reason for South's growing car market . . .

ing pattern of the Southeast has changed so much that it has been necessary to compile completely new data. Even so, sales estimates have often been on the low side, he reports.

What Caused Sales Gain

Causes for the sales gains in the Southeast are difficult to spot. Income for the entire nation has been climbing more or less steadily since 1947. This accounts for part of the increase, but there are other important factors pushing up southern sales.

New minimum wage and hour laws have undoubtedly boosted purchasing power of this region. Bigger crops, sold at higher prices, have raised the farmers' income, and Federal guarantees have put more money in the share cropper's pocket.

But informed automotive marketing analysts believe increased industrialization of the South is the number one factor in the growing importance of the southeastern market.

Detroit Has Big Stake

The auto industry does not regard the South's surge of strength as temporary. Judging from the expansion programs the industry has just completed and plans for the future it must be confident that markets will continue to develop.

At present, Ford has assembly plants operating at Atlanta, Norfolk, Memphis and Louisville, totaling more than 1.88 million sq ft. A new plant at Louisville, scheduled for completion in 1955, will result in a net gain of another million sq ft.

Both the Ford-Atlanta plant and Ford-Louisville assembly plants were added during the postwar period. Since both these assembly plants buy huge quantities of materials and industrial products locally, they have undoubtedly stimulated industrial growth in this area.

In addition to these plants, Ford

now has large parts depots at Atlanta, Charlotte, Memphis, Richmond, Jacksonville and New Orleans. Four of these depots were built during 1951-52.

GM Moved in Too

During the prewar period, General Motors had no medium-priced car assembly plants in the Southeast. At that time it was thought that the market wasn't large enough to justify such an operation.

But in 1947 a Buick-Olds-Pontiac assembly plant comprising 1,070,000 sq ft was opened at Atlanta. Output of this plant has been entirely absorbed by the southeastern market ever since the plant started production.

Buick-GMC Truck and United Motors now have large warehouses at Atlanta and Memphis totaling nearly 300,000 sq ft. In addition, there is the Chevrolet-Fisher Body plant at Atlanta.

Up to the present time, no automotive manufacturing facilities have been set up in the South. But the volume of parts and equipment purchased locally has steadily increased.

Before enlarging its stake in the

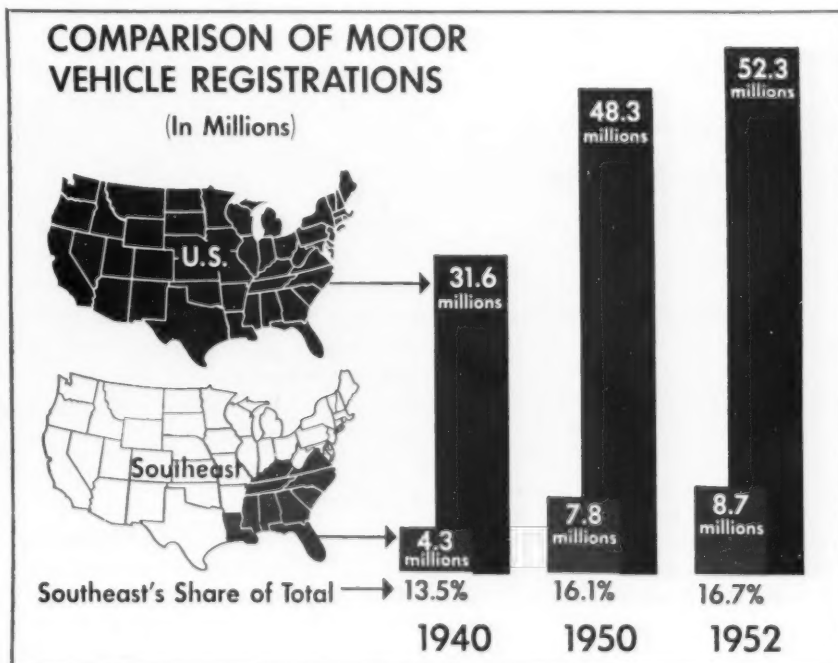
South, the auto industry made intensive studies of all cost factors, including inbound and outbound freight, labor, taxes and other items.

But favorable wage differentials were not an important factor in the automotive industry's decision to expand assembly operations in the South. Because comparatively few workers are needed in an assembly plant, the wage factor is not so important a consideration as it is in many other operations using more labor.

Pay About the Same

Among 20 wage classifications involved in assembly work, metal finishers, welders, and painters are probably the most important. Compared with wages paid these workers in comparable Northern plants, hourly wages in the South are not more than 2¢ apart for most classifications.

As Detroit auto sales executives see it, both the quantity and quality of auto sales in the southeastern states has improved sharply during the post war period. And automakers plan to watch this rapidly growing sales area very closely during the next few years.



What About the South's Labor?

Growing markets, modern plants and new equipment are the vital forces behind the South's industrial development . . . Importance of cheap labor is fast fading as a

factor in the expansion as North-South wage differentials break down . . . Southern labor is proving its ability in skilled industrial work . . . Farm experience helps.

IF YOU ARE one who regards the South as a mecca of cheap labor, no unions, and lack of industrial ability, someone has been kidding you. It just isn't so.

Labor in the South is today less important to the industrial revolution there than are materials and markets. What might have been true years ago cuts no ice today—nor will it in the coming years of more Southern expansion. Availability and attitudes of labor are far more important than wage rates.

The myth that Southern labor is slower to learn how to produce is poppycock—it is not borne out by studies made by plants which have moved South. Where then did the worker's native ability for industrialization come from if the South has been predominantly an agricultural area for years?

The answer is simple. Innate ability of Southern workers to

learn fast at trades and skills stems from what they, their fathers and grandfathers did on the farm. On a farm you must be a jack-of-all-trades. That, says a Southern labor expert, is why there is no difference in training results—measured by standard norms—between Northern and Southern labor. His studies and his plant's performance prove his stand.

Interview after interview with management, labor and consumer disclosed that:

❑ Wage differentials between South and North are fast fading; have faded in many industries such as steel, light metals and some textile areas.

❑ Labor unions were making inroads—many times with help of companies—which indicated “no escape from union organizing activities.”

❑ Textiles are the No. 1 target for CIO drives. That is where the greatest holdout against unions is at present in the South. The unions say it will be broken down fast. But textile people and some town officials are just as certain it won't.

❑ Management-labor relations in the South have become mature and cooperative—on the whole. There are still those who don't want unions, high wages and fringe benefits, but they are in the minority.

❑ Those who don't want unions or union interference are paying top wages to keep it that way. Some towns still offer “no union” guarantees for 5 years.

❑ Negro labor is still mostly unskilled but semi-skilled jobs are expanding. Segregation is the rule with some important exceptions. Time is with the Negro and the color problem is working itself out. Economic pressure of paying huge amounts for Negro education, only to lose the finished product to other regions, is changing the minds of some Southerners on the whole Negro question—but change is coming slowly.

❑ Shortage of vocational high schools means a bigger job of training for industry. Most training is being done by industrial firms with excellent response and results.

❑ Automation is the keynote in Southern industrial expansion as it helps manufacturers compensate for high labor costs and provides more labor for other jobs. Textile and chemical industries are the major users of automation techniques in the South.

Boris Shishkin, AFL Research Director, hit the nail on the head when he said, “The trend in the new pattern of Southern industrial development is toward greater management emphasis on the cost advantages of new plants, modern machinery, and readily accessible raw materials, rather than on the fleeting and questionable savings from cheap labor.”

What could be added, of course, is the happy fact that highly paid workers and wage earners who produce with the best of management's tools are consumers of all industry's products. The South is proving that every day.

More Tractors Mean More Labor

	NO. OF TRACTORS		PCT IN
	U. S.	SOUTHEAST	SOUTHEAST
1940	1,567,430	97,963	6.2
1950	3,400,000	465,000	13.7
1951	3,801,123	520,346	13.7
1952	4,030,000	616,000	15.3
1953	4,234,007	747,846	17.7

Number of tractors in the Southeast has increased 663 pct since 1940, compared with the national average of 170 pct. That's one reason the South has such a big reservoir of labor which can be trained for skilled work.

Southern Newsfront—

a look to the Future

PER CAPITA INCOME IN SOUTHERN STATES in 1940 was about 56 pct of U. S. per capita income figure. By the end of 1953 it will be about 70 pct of the national figure. In the next 10 years, the South will eliminate the gap.

UTILITY DEVELOPMENT IN THE SOUTH, including telephones and electrical power, will show a 45 to 50 pct increase in the next 10 years. Actual expansion by 1963 will be more since this estimate is conservative.

STEEL CONSUMPTION IN THE SOUTHEAST is expanding faster than for the country as a whole. It is estimated that the Southeast accounts for about 10 pct of U. S. consumption. In the next decade this figure is expected to hit 15 pct.

OIL EXPLORATION IS UNDERWAY in Georgia and Florida. Oil fields are now producing in Mississippi and Alabama. This means an oil economy in the Southeast within the next 10 years will be superimposed on other industrial developments.

EMIGRATION FROM THE SOUTH is slowing up. Population growth there has been less than the U. S. average. More opportunities are turning up in the South for Southerners. Also more Northerners are moving in. Both trends will speedup, meaning larger markets, better standards of living.

CHEMICAL PRODUCTION IN THE SOUTH may reach more than 50 pct of the total for the nation in 10 years, estimates Southern Assn. of Science & Industry. At present the South accounts for about 25 pct of the chemicals made in the country.

MESHING OF FARM AND INDUSTRIAL WORK is the goal of most Southern towns and cities seeking new industries. Current trend is in that direction. Farm people work at plants and drive to and from their farms.

ONE-INDUSTRY TOWNS IN THE SOUTH are on their way out. New plans call for more diversification of industry. This is why the more successful and much sought after areas are trying to get additional plants.

AIR CONDITIONING WILL BE A BOON for the South and is already offsetting loss of efficiency due to hot weather. Sales of room-conditioners are mounting. Air-conditioning of new buildings has become a must.

TRUCK LINES AND WAREHOUSES ARE mushrooming in the South. More than 60 motor truck lines enter Birmingham alone. Of these only eight are strictly intrastate. There are 22 terminal and warehouse buildings in the city now. Motor trucking trend is the same in other parts of the South.

WHO ARE THEY? WHAT DO THEY MAKE?

Directory of Southern Metalworking Plants

Southern plants are expanding rapidly. Firms which a few years ago employed 20 workers now have as many as 50 or 75 . . . The picture changes rapidly . . . A small company today is a big potential buyer tomorrow . . . The plants named in this directory are all metalworking firms that are getting bigger in a hurry.

Alabama

- A & J Mfg. Co., Inc.**
207 Locust St., Gadsden
Stoves.
- Agricola Furnace Co., Inc.**
N. 12th St., Gadsden
Furnaces, stoves, pipe fittings.
- Alabama Metal Lath Co., Inc.**
3245 Fayette Ave., Birmingham
Metal lath, etc.
- Alabama Metal Products Co.**
1507 N. 11th St., Bessemer
Metal cabinets and sinks.
- Alabama Pipe Co.**
410 W. 20th St., Anniston
Cast iron soil pipe, valves, meter boxes.
- Alabama Pipe Co.**
Gadsden
Soil pipe and fittings.
- Alabama Pipe Co.**
Talladega
Soil pipe and fittings.
- Alabama Steel Co.**
109 S. 41st St., Birmingham
Reinforcing steel fabricators.
- Alabama Tin Shop**
126 N. Court St., Montgomery
Sheet metal work.
- Alabama Venetian Blind Co.**
3732 5th Ave., Birmingham
Venetian blinds, aluminum screens.
- Allis-Chalmers Mfg. Co.**
2509 E. Broad St., Gadsden
Tractors and implements.
- Aluminum Ore Co.**
Box 1346, Mobile
Alumina.
- American Brake Shoe Co.**
600 Ave F., Birmingham
Cast iron car wheels.
- American Bridge Div., U. S. Steel Co.**
P. O. Box 116, Birmingham
Structural steel.
- American Cast Iron Pipe Co.**
2930 N. 16th St., Birmingham
Cast iron pipe, steel castings and tubes.
- American Mfg. Co., Inc.**
Hunter's Station, Montgomery
Trucks, refrigeration units.
- American Radiator & Standard Sanitary Corp.**
503 S. 22nd St., Birmingham
Radiators, boilers, etc.
- Anderson Brass Works, Inc.**
700 N. 44th St., Birmingham
Electric power connectors, supports.
- Anniston Foundry Co.**
Box 471, Anniston
Cast iron soil pipe, fittings.
- Anniston Mfg. Co.**
11th and R.R. Sts., Anniston
Drills, sheet work.
- Anniston Soil Pipe Co., Inc.**
Box 191, Anniston
Cast iron soil pipe, fittings.
- Appleton Electric Co.**
Trussville
Electrical equipment.
- Armstrong Mfg. Co.**
Brecon, Talladega
Radiators, sheet metal products.
- Attalla Foundry & Machine Co.**
Attalla
Castings.
- Attalla Pipe & Foundry Co., Inc.**
Box 211, Attalla
Cast iron soil pipe, fittings.
- Attalla Pipe & Foundry Co., Inc.**
Gadsden
Cast iron soil pipe and fittings.
- Avondale Stove & Foundry Co.**
2500 N. 27th Ave., Birmingham
Stoves, castings.
- Bagwell Steel Co., Inc.**
2525 8th Ave. N., Bessemer
LP-gas systems, tanks.
- Bama Foundry**
1412 N. Court St., Montgomery
Foundry work, machine shop work.
- Bayliss Machine & Welding Co.**
1001 N. 19th St., Birmingham
Machine work, welding.
- Bessemer Galvanizing Works**
2100 18th Ave. N., Bessemer
Hot dip galvanizers.
- Birmingham Electric & Mfg. Co.**
7 S. W. 18th St., Birmingham
Motor and control coils.
- Birmingham Fabricating Co.**
724 Ave. W., Birmingham
Structural steel, stampings.
- Birmingham Industrial Machinery Co.**
4601 First Ave. S., Birmingham
Conveyors, elevators, woodworking machinery.
- Birmingham Mfg. Co.**
2001 N. 50th Way, Birmingham
Trailers, truck bodies.
- Birmingham Ornamental Iron Co., Inc.**
4363 First Ave. N., Birmingham
Ornamental iron, furniture.
- Birmingham Stove & Range Co.**
Tenn. Pike, Birmingham
Stoves, heaters.
- Birmingham Tank Co.**
620 Ave. D.S., Birmingham
Tanks, smoke stacks.
- John Blue Co., Inc.**
Huntsville
Farm implements.
- Borden Metal Products Co., Inc.**
Leeds
Steel grills, steps, handrails.
- G. B. Bragan Roofing & Heating Co.**
833 N. 20th St., Birmingham
Sheet metal work.
- W. J. Bullock, Inc.**
1501 Erie St., Birmingham
Nonferrous smelters and refiners.
- Cabometer, Inc.**
Box 671, Anniston
Taxicab meters, stampings.
- Caldwell Foundry & Machine Co., Inc.**
518 N. 14th St., Birmingham
Iron, steel castings, conveyors, scrap shears.
- Lee Carver Co., Inc.**
1704 4th Ave., Birmingham
Stampings, jacks, machinery.
- J. I. Case Co.**
10th & Glenaddie Sts., Anniston
Farm implements.
- Ceco Steel Products Corp.**
3500 27th Ave. N., Birmingham
Joists, reinforcing steel.
- Central Foundry Co.**
Holt
Soil pipe and fittings.
- Cherokee Centrifugal Foundry Co., Inc.**
Box 565, Alexander City
Soil pipe, fittings, meter boxes.
- Chicago Bridge & Iron Co.**
1500 N. 50th St., Birmingham
Fabricated structural steel.
- James B. Clow & Sons**
Birmingham
Cast iron pressure pipe, fittings.
- Connors Steel Div., H. K. Porter Co., Inc.**
500 Powell Ave., Birmingham
Hot-rolled steel strip, bars, wire, fence.
- Continental Gin Co.**
Box 2614, Birmingham
Gins, oil mill machinery, conveying equipment.
- Continental Gin Co.**
Prattville
Gins, oil mill machinery, conveying equipment.
- W. L. Coston & Sons**
Box 8651, Birmingham
Tanks, structural work.
- Crane Co.**
Birmingham
Cast iron pipe, fittings.
- Crane Foundry Co.**
3001 N. 28 Place, Birmingham
Cooking utensils, iron castings, builders hardware.
- Cruse Crawford Mfg. Co.**
2200 2nd Ave. S., Birmingham
Bus and special bodies.
- Culp Iron Works**
7th Ave., Attalla
Steel fabrication.
- Decatur Iron & Steel Co., Inc.**
2nd St., Decatur
Fabricated structural steel, windows.
- Decatur Pump Co.**
Decatur
Tanks.
- Diamond Roofing & Sheet Metal Works**
1007 1/2 Springhill Ave., Mobile
Sheet metal work.

Railroad freight traffic in the South has increased 77 pct since 1940 . . .

Jackson Weatherproof Nail Co.
2515 N. 29th Ave., Birmingham
Special nails.

Omick Casting Co.
1006 37 Place N., Birmingham
Gray iron castings.

Osake Bronze Co., Inc.
2231 27th Ave., Birmingham
Bronze castings, parts.

Osake Pipe & Foundry Co., Inc.
Pell City
Cast iron pipe and fittings.

Dorsey Trailers, Inc.
Elba
Truck-trailers.

Dothan Roofing & Heating Co.
109 S. St. Andrews St., Dothan
Sheet metal work.

Eagle Iron & Brass Co.
W. 3rd St., Sylacauga
Brass and iron castings.

East Birmingham Bronze Foundry Co.
831 N. 36th Way, Birmingham
Nonferrous castings, ice cream freezers.

Electro Metallurgical Div., Union Carbide and Carbon Corp.
Muscle Shoals City, Sheffield
Ferroalloys.

Emory Pipe & Foundry Co., Inc.
Anniston
Cast iron soil pipe, fittings.

Fairbanks-Morse & Co.
525 N. 9th St., Birmingham
Generators, pumps, lighting plants.

Fairfield Barrel Co., Inc.
4000 Commerce Ave., Fairfield
Containers, wall ties.

Federated Metals Div., American Smelting & Refining Co.
Birmingham
Nonferrous metal refining.

Ferro Fabricating Co., Inc.
3333 27th Ave. N., Birmingham
Fabricated structural steel.

Fontaine Truck Equipment & Co., Inc.
1232 37th Place N., Birmingham
Machinery trailers, bodies.

Gadsden Heating & Sheet Metal Co.
1st Ave. at 10th St., Gadsden
Furnaces, ducts.

General Steel Tank Co., Inc.
4000 N. 8th Ave., Birmingham
Tanks, coal washing machines.

A. J. Gerrard & Co.
8 S. 13th St., Birmingham
Steel strapping.

Gerrard Steel Strapping Co.
912 N. 20th St., Birmingham
Steel strapping.

Gulf Foundry & Machine Co.
300 S. Water St., Mobile
Foundry and machine shop.

Hahn Roofing & Heating Co., Inc.
1905 2nd Ave. S., Birmingham
Sheet metal work.

Hardie-Tynes Mfg. Co., Inc.
800 N. 28th St., Birmingham
Air compressors, hydraulic machinery.

Hartley Boiler Works
Railroad Ave., Montgomery
Castings, steel tanks, machine parts.

Hawkins Iron Co., Inc.
315 N. 4th St., Birmingham
Structural steel fabrication.

Hayes Mfg. Co.
Municipal Airport Area, Birmingham
Aircraft armament.

Hill & Griffith Co.
2931 7th Ave. N., Birmingham
Foundry facings and accessories.

Ingalls Iron Works Co.
620 Ave. D.S., Birmingham
Structural steel fabricators.

Ingalls Shipbuilding Co.
Decatur
Steel barges.

Ingalls Shipbuilding Corp.
620 4th Ave. S., Birmingham
Steel ships and barges.

Interstate Roofing Co., Inc.
1016 Gurnee Ave., Anniston
Sheet metal fabrication.

Jackson Industries, Inc.
925 N. 37th St., Birmingham
Veneer lathes, conveyors, iron castings.

Jackson Mfg. Co., Inc.
1501 W. Fairview Ave., Montgomery
Fans, electric lawn mowers.

Jacksonville Soil Pipe Foundry
Jacksonville
Cast iron soil pipe and fittings.

Jacobs Mfg. Co.
Bridgeport
Stoves, gray iron, malleable castings.

Jefferson Foundry Co., Inc.
800 N. 41st St., Birmingham
Iron and steel castings.

Jones Sheet Metal & Machine Works
16th St. & 2nd Ave., Opelika
Textile mill parts.

Kilby Steel Co.
Anniston
Artillery shells.

T. C. King Pipe & Foundry Co.
1831 Front St., Anniston
Cast iron soil pipe, fittings.

King Stove & Range Co.
Sheffield
Stoves, hollowware.

W. H. Kirkland Co.
Anniston
Cast iron pipe.

Lamson & Sessions Co.
3103 27th Ave. N., Birmingham
Fasteners.

Lawler Machine & Foundry Co.
622 N. 44th St., Birmingham
Jobbing foundry.

Lee Bros. Foundry Co.
17th & Walnut, Anniston
Brass fittings, castings.

Leff Engineering Co.
556 St. Louis St., Mobile
Pumps, fans, sheet metal fabrication.

Lerio Corp.
201 S. Royal St., Mobile
Steel drums, truck bodies, pumps.

Line Material Co.
1700 Vanderbilt Road, Birmingham
Pole line hardware, fabricated steel.

McWane Cast Iron Pipe Co.
1201 Vanderbilt Road, Birmingham
Cast iron pressure pipe, fittings.

M. & H. Valve Fittings Co.
23rd & Railroad Sts., Anniston
Valves, fittings, fire hydrants.

Madsen Engineering Co.
1601 Queen City Ave., Tuscaloosa
Boats.

Manderson Iron & Steel Co.
201 N. 22nd St., Gadsden
Ornamental iron, steel fabrication.

Martin Stamping & Stove Co.
905 5th Ave. W., Huntsville
Gas, electric heaters, stampings.

Martin Stove & Range Co.
Florence
Stoves, hollowware.

Meadow Steel Products, Inc.
4401 Morris Ave., Birmingham
Reinforced concrete bar supports, specialties.

Metal Fabricators & Finishers, Inc.
8707 N. 1st Ave., Birmingham
Metal stamping.

Midland Wire Corp.
29th Ave. and 35th St. N., Birmingham
Electrical industry wire.

Miller Foundry
745 N. 44th St., Birmingham
Iron castings.

Mobile Pulley & Machine Works
905 S. Ann St., Mobile
Iron and steel castings.

Mobile Steel Co., Inc.
616 N. Conception, Mobile
Structural steel fabricating.

Montgomery Coal Washing & Mfg. Co.
4000 8th Ave. N., Birmingham
Coal washers, structural steel.

Moore, Sherwood Iron Works, Inc.
116 Graymont Ave., Birmingham
Ornamental iron, structural steel.

Morrison Railway Supply Corp.
1831 29th Ave. N., Birmingham
Tanks, LP-gas systems.

Munro-Van Helms Co.
Anniston
Cast iron soil pipe and fittings.

Munro-Van Helms Co.
Jacksonville
Cast iron soil pipe and fittings.

Munro-Van Helms Co.
Lincoln
Cast iron soil pipe and fittings.

Munro-Van Helms Co.
Talladega
Drains, soil pipe, fittings.

M. A. Murray & Sons Boiler Shop
Box 365
Steel fabrication.

Nashville Bridge Co.
Bessemer
Fabricated structural steel.

Nelems Mfg. Co.
1716 National St., Birmingham
Steel porch and lawn furniture.

Newberry Mfg. Co., Inc.
209 17th St., Talladega
Cast iron pipe fittings.

John Parks Newsome, Inc.
1705 1st Ave. N., Birmingham
Metal furniture.

Nichols-McQueen Mfg. Co.
2201 1st Ave., Birmingham
Iron castings.

Nichols Trailer & Equipment Co.
Montgomery Highway, Dothan
Truck and trailer bodies.

O'Neal Steel Works Co.
715 N. 41st St., Birmingham
Fabricated steel buildings.

Opelika Foundry Co., Inc.
Box 326, Opelika
Gray iron castings.

Ornamental Foundry
410 W. 20th St., Anniston
Cast iron soil pipe and fittings.

Parts Service Co., Inc.
408 Bibb St., Montgomery
Engine rebuilding, machine shop work.

Peerless Pipe & Foundry Co.
Box 749, Anniston
Cast iron soil pipe and fittings.

Phenix Foundry
1601 14th Ave., Phenix City
Gray iron castings.

Trend toward industrial decentralization means more plants for the South . . .

Prowell Stove Foundry Co.
2514 N. 27th Ave., Birmingham
Stove and range parts.

Pullman Standard Car Mfg. Co.
401 N. 24th St., Bessemer
Railroad cars.

Pullman-Standard Car Mfg. Co.
1005 First National Bldg., Birmingham
Freight cars, parts.

Rail Joint Reforming Co.
2715 N. 18th St., Birmingham
Hot and cold forgings.

Republic Steel Corp.
Gadsden
Pig iron, coke, rolled steel products.

Reynolds Metals Co.
Listerhill, Sheffield
All aluminum mill products.

Robinson Foundry & Builders Supply
Box 403, Alexander City
Ornamental iron, furniture, castings, soil pipe.

Rudisill Foundry Co.
Front and Elm Sts., Anniston
Cast iron soil pipe and fittings.

Rudisill Foundry Co.
Sylacauga
Cast iron soil pipe and fittings.

Rushton Equipment Co.
2126 4th Ave. S., Birmingham
Fabricating and construction.

Russell Pipe & Foundry Co., Inc.
Box 112, Alexander City
Cast iron soil pipe and fittings.

Russell Pipe & Foundry Co., Inc.
Anniston
Soil pipe and fittings.

Salmon & Co., Inc.
2822 5th Ave. S., Birmingham
Drills, compressors, pumps

C. E. Sawyer's Industrial Sheet Metal Fabricators
3917 N. 10th Ave., Birmingham
Sheet metal fabrication, stampings.

Security Roofing Co.
203 Lexington Ave., Mobile
Sheet metal work.

Selma Foundry & Machine Co.
Sylvan St., Selma
Gray iron castings.

Shook & Fletcher Supply Co.
Russellville
Iron ore.

Signode Steel Strapping Co.
926 W. 22nd St., Birmingham
Steel strapping.

Sloss-Sheffield Steel & Iron Co.
3131 First Ave. N., Birmingham
Pig iron, ferromanganese, coke.

Snyder Tank Corp.
787 N. 41st St., Birmingham
Steel plate work, tanks.

Southeastern Metals Co.
3925 N. 29th St., Birmingham
Electric weld mechanical tubing, stampings.

Southern Car & Mfg. Co., Inc.
400 S. 7th St., Birmingham
Structural steel, forgings, castings.

Southern Coach Mfg. Co., Inc.
Evergreen
Motor coaches.

Southern Household Products Co., Inc.
3640 10th Ave. N., Birmingham
Metal furniture, cabinets.

Southern Permanent Awning Co., Inc.
628 Robinson St., Huntsville
Aluminum awnings.

Southern States Iron Roofing Co.
521 N. 28th St., Birmingham
Steel, aluminum roofing, fence posts.

Southern Wire & Steel Products Co., Inc.
528 N. 37th St., Birmingham
Partitions, machine guards, switch boxes.

Southland Mower Co., Inc.
29 N. Division St., Selma
Lawnmowers.

Standard Forge & Axle Co.
Box 989, Montgomery
Truck axles and brakes, forgings.

Standard Foundry
Anniston
Cast iron pipe fittings.

Steel of Alabama, Inc.
2830 7th Ave., Bessemer
Soil pipe, fittings.

Steel Fabricating & Machinery Co., Inc.
3226 5th Ave. S., Birmingham
Fabricated structural steel, furnaces.

Charles C. Steward Machine Co.
1236 N. Appalachee St., Birmingham
Blast furnace, mining, special machinery.

Stockham Valves & Fittings
4000 10th Ave. N., Birmingham
Cast iron pipe fittings, valves.

Strickland Bros. Machine Co., Inc.
2804 12th St., Tuscaloosa
Saw mill machinery, castings.

Talladega Foundry & Machine Co.
Talladega
Iron, brass, aluminum castings.

Taylor-Wharton Iron & Steel Co.
2910 35th Ave. N., Birmingham
Track accessories.

Charles Temerson & Sons
Box 378, Tuscaloosa
Fabricated steel.

Tennessee Coal & Iron Div., U. S. Steel Co.
Box 599, Fairfield
Integrated steel mill.

Thomas Foundries, Inc.
3800 10th Ave. N., Birmingham
Pumps, castings.

Trailmobile Co., Inc.
2721 5th Ave. S., Birmingham
Trailers.

Truscon Steel Co.
Gadsden
Mesh, reinforcing bars.

Union Foundry Co.
Anniston
Cast iron pipe fittings.

Unit Stove & Enameling Co.
3300 N. 35th Ave., Birmingham
Stoves, heaters, enameling.

U. S. Pipe & Foundry Co.
Bessemer
Cast iron pressure pipe, special machinery.

U. S. Pipe & Foundry Co.
3000 30th Ave. N., Birmingham
Cast iron pressure pipe, special machinery.

Virginia Steel Co.
1007 37th Pl. N., Birmingham
Structural steel fabricators.

Vulcan Metal Products Co., Inc.
5015 19th Ave. N., Birmingham
Aluminum windows, hardware, sash.

Vulcan Rivet & Bolt Fabrication, Inc.
Box 1991, Birmingham
Fasteners and spikes.

Wallwork Foundry Co.
2 W. 15th St., Birmingham
Iron, steel castings.

Webb Motor Co.
Box 241, Demopolis
Saws, rakes, implements.

Weir-Kilby Corp.
2910 N. 35th Ave., Birmingham
Track supplies.

Westinghouse Electric Corp.
33rd St. and 3rd Ave., Birmingham
Electrical and steam apparatus.

Wolverine Tube Div., Calumet & Hecla Consolidated
Copper Co.
Decatur
Copper and aluminum tubing.

Woodward Iron Co.
Woodward
Pig iron, coal chemicals.

Florida

A B C Steel Equipment Co., Inc.
1st Ave. & 17th St., Tampa
Fabricated structural steel.

A & W Engineering Co.
1596 Riverside Station, Miami
Fabricated structural steel.

Aerodex, Inc.
Box 123, Miami
Aircraft parts and auxiliary equipment.

Aeronautical Communications Equipment, Inc.
3090 Douglas Road, Miami
Laboratory, scientific and engineering instruments.

Aircraft Service Corp.
Box 756, Miami
Aircraft parts and auxiliary equipment.

Air-Vue Products Corp.
Box 151, Opa Locka
Jalousies, shutters, metal awnings.

Allied Welding Co.
49 Lorna Doone Blvd., Orlando
Tanks, boilers.

American Airmotive Corp.
Box 6, Miami Springs
Aircraft parts and auxiliary equipment.

American Can Co.
Box 1732, Tampa
Tin cans.

American Collair Corp.
Box 2300, Jacksonville
Gray iron castings.

American Machinery Corp.
Box 3228, Orlando
Food products machinery.

Ange Machine Shop
Cross City
Machine shop.

Apex Roofing & Sheet Metal Co., Inc.
Box 575, Dania
Sheet metal work.

Armco Drainage & Metal Products, Inc.
1737 Jessie, Jacksonville
Welded pipe, fabricated structural steel.

Arnold Products, Inc.
Box 1968, Opa Locka
Jalousies, shutters, metal awnings.

Bay Foundry & Machine Works
E. Hillsboro & 42nd St., Tampa
Nonferrous castings.

Bell River Marine Ways, Inc.
Fernandina
Boat building.

Appliance business in the Southeast has doubled during the last 13 years . . .

Bell Sheet Metal
3690 S. Tamiami Trail, Sarasota
Sheet metal work.

Best Roofing & Sheet Metal Works, Inc.
1517 N. Poinsettia Ave., West Palm Beach
Sheet metal work.

Bosquinda Corp.
Box 36, St. Petersburg
Sheet metal work.

Edward Marine, Inc.
Box 1622, Ft. Lauderdale
Fabricated structural steel.

Edward Sheet Metal Works
528 N.W. 1st Ave., Ft. Lauderdale
Sheet metal work.

C. J. Bryson
3235 N. Miami Ave., Miami
Fabricated structural steel.

Burd Metal Products, Inc.
Box 1377, Clearwater
Fabricated structural steel.

Bushnell-Lyons Iron Works, Inc.
Box 2672, Tampa
Fabricated structural steel.

Bushnell Steel Co.
Box 2579, Jacksonville
Fabricated structural steel.

Bushnell Steel Products, Inc.
Box 576, Miami
Fabricated structural steel.

C. I. Capps Co., Inc.
1727 Bennett, Jacksonville
Heavy steel plate fabrication.

Carpenter's Sheet Metal Works
915 N. Poinsettia Ave., West Palm Beach
Sheet metal work.

Clinton Foods, Inc.
Box 157, Dunedin
Food products machinery.

H. G. Coffman Co., Inc.
Box 1113, Orlando
Fabricated structural steel.

Continental Can Co., Inc.
Box 649, Auburndale
Tin cans.

Continental Can Co., Inc.
Box 1469, Tampa
Tin cans.

Correct Craft, Inc.
N. Washington Ave., Titusville
Boat building.

Crown Can Co.
Box 512, Orlando
Tin cans.

Dade Drydock Corp.
Box 4381, Miami
Ship building.

Dave Fyfe Truck Body Mfg.
2908 Tampa St., Tampa
Truck and bus bodies.

Daytona Beach Boat Works, Inc.
701 S. Beach St., Daytona Beach
Boat building.

Daytona Sheet Metal Works
116 S. Seagrave Ave., Daytona Beach
Sheet metal work.

Depend-on Roofing & Sheet Metal
3153 N.W. South River Drive, Miami
Sheet metal work.

Diesel Engine Sales Co., Inc.
Box 658, St. Augustine
Machine shop.

Dixie Galvanizing & Tank Co.
Box 2368, Jacksonville
Heavy steel plate fabrication.

Donsen Corp.
Box 1214, Miami
Metal household furniture.

Dooley's Basin & Dry Dock, Inc.
1500 S.W. 20th St., Ft. Lauderdale
Boat building.

G. M. Dykes Iron Works, Inc.
69 N.W. 3rd St., Miami
Forgings, heavy steel plate fabrication.

Empire Steel Products Corp.
601 S. Moody, Tampa
Heavy steel plate fabrication.

Ferber Sheet Metal Works
4121 Evergreen, Jacksonville
Stamped metal products.

Fillingham Bros.
1060 Pearl, Jacksonville
Sheet metal work.

Florida Drum Co., Inc.
Box 1829, Pensacola
Metal drums.

Florida Engineering & Dry Dock Co.
2222 N.W. 14th St., Miami
Ship building.

Florida Machine & Foundry Co.
Box 2670, Jacksonville
Steel castings.

Florida Pipe & Foundry Co.
Box 187, Haines City
Machine shop.

Florida Plastic Tops Corp.
Box 1924, Opa Locka
Metal household furniture.

Florida Steel Products, Inc.
215 S. Rome Ave., Tampa
Fabricated structural steel.

Florida Weathermakers, Inc.
1538 Hendricks Ave., Jacksonville
Sheet metal work.

Food Machinery & Chemical Corp.
Box 1718, Lakeland
Aluminum irrigation systems.

Food Machinery & Chemical Corp., Speed Sprayer Div.
1312 W. Washington, Orlando
Agricultural machinery.

Fram Florida, Inc.
Drawer P, Jacksonville
Motor vehicle parts and accessories.

Fruit Treating Corp.
133 W. Grant, Orlando
Agricultural machinery.

Gainesville Foundry & Machine Works
Box 154, Gainesville
Gray iron castings.

Gainesville Heating & Air Conditioning
Box 433, Gainesville
Sheet metal work.

Gaynon Iron Works
Box 3006, Jacksonville
Pipe, steel plate fabrication.

General Sheet Metal & Roofing Inc.
1943 N.W. 1st St., Miami
Sheet metal work.

F. C. George Machine Co.
Box 3671, Orlando
Construction, mining and similar machinery.

Gibbs Corp.
Box 4368, Jacksonville
Ship building.

Giffen Industries, Inc.
Box 6331, Coral Gables
Solar water heaters.

Global Industries, Inc.
316 S.W. North River Drive, Miami
Fabricated structural steel.

R. J. Gould Welding & Erecting Co., Inc.
301 S. Florida, Tampa
Heavy steel plate fabrication.

Grimland, Inc.
Box 505, Jacksonville
Stamped metal products.

Gulf Machinery Co.
Box 187, Clearwater
Nonferrous and gray iron castings.

Hawthorne Roofing Co.
1501 S. Dixie, West Palm Beach
Sheet metal work.

Henderson, Inc.
429 Park, West Palm Beach
Sheet metal work.

Hendry Corp.
Rattlesnake
Ship building.

Huckins Yacht Corp.
Box 6336, Jacksonville
Boat building.

Jacksonville Blow Pipe Co.
Box 862, Jacksonville
Blowers, exhaust and ventilating fans.

Jafra, Inc.
Box E, Miami
Fabricated structural steel.

Jafra, Inc.
Ojus
Boat building.

Jamieson Aircraft Co., Inc.
Box 906, DeLand
Aircraft parts and auxiliary equipment.

Jones Boat Yard
3361 N.W. South River Drive, Miami
Boat building.

Kissam Builders' Supply Co.
Box 1431, Orlando
Construction, mining and similar machinery.

Kool-Vent Metal Awning Co. of Tampa, Inc.
McDill Ave., Tampa
Jalousies, shutters, metal awnings.

Krauss Sheet Metal & Roofing
Box 1237, St. Petersburg
Sheet metal work.

Lake Worth Marine Ways
Box 207, Lantana
Boat building.

Layne Atlantic Co.
Box 2431, Orlando
Turbines and parts.

Llewellyn Machinery Corp.
1030 N. Miami Ave., Miami
Machine shop.

Lockhart Music Service Woodworking & Machine Shop
Haines City
Machine shop.

McLean Iron Works, Inc.
Box 550, Palatka
Gray iron castings.

Maddox Foundry & Machine Works, Inc.
Archer
Gray iron castings.

Marden Mfg. Co.
605 Denton Ave., Auburndale
Agricultural machinery.

Marion Heating & Roofing Co., Inc.
Box 42, Ocala
Sheet metal work.

Markham System
29 W. Government, Pensacola
Sheet metal work.

Merrill-Stevens Dry Dock Co.
Box 1980, Miami
Ship building.

Metal Products Corp.
807 N.W. 20th St., Miami
Metal doors.

Miami Beach Boat Slips, Inc.
1928 Purdy Ave., Miami Beach
Boat building.

Miami Roofing & Sheet Metal Co.
Box G, Miami
Metal doors.

Diversification will be the source of further expansion in the South . . .

Miami Shipbuilding Corp.
615 S.W. 2nd Ave., Miami
Construction, mining and similar machinery.

Mid-States Steel & Wire Co.
Box 4008, Jacksonville
Wire drawing.

Miller Trailers, Inc.
708 3rd St. W., Bradenton
Truck and bus bodies.

Moore Dry Kiln Co.
Box 4248, Jacksonville
Industrial trucks, stackers.

Moore Pipe & Sprinkler Co.
Box 4248, Jacksonville
Sprinkler systems.

National Autocraft Mfg. Co.
2710 N. Orange, Orlando
Motor vehicle parts and accessories.

Nelson Boat Corp.
471 N.E. 79th St., Miami
Boat building.

George Obenour, Jr.
64 N.E. 73rd St., Miami
Sheet metal work.

Olson Corp.
Beresford
Agricultural machinery.

Opa Locka Aircraft Engine Station, Inc.
Box 464, Opa Locka
Machine shop.

Ornamental Products Corp.
Box 125, Miami
Nonferrous castings.

Palmer's Roofing Co., Inc.
Box 1750, Miami
Sheet metal work.

Pan-American Metal Products Co., Inc.
401 N.W. 71st St., Miami
Small hardware.

Pan American Solar Heater, Inc.
Box 2800, Tampa
Solar water heaters.

Paragon Marine Construction Co., Inc.
1834 Purdy Ave., Miami Beach
Boat building.

Pinellas Machine Co.
838 3rd St., S., St. Petersburg
Fabricated structural steel.

Plant City Welding & Tank Co.
Box 1308, Plant City
Fabricated structural steel.

J. C. Pressly & Co.
2027 2nd Ave., S., St. Petersburg
Fabricated structural steel.

Pro-Tect-U Awning Shutter Corp.
2762 S.W. 10th St., Miami
Metal doors.

Race & Race, Inc.
Box 1436, Winter Haven
Metal doors.

Radiation, Inc.
Box 217, Melbourne
Radio, radar and television equipment.

Rebozo Sheet Metal Works
440 S.W. 8th St., Miami
Sheet metal work.

Matt G. Reeves & Co., Inc.
Box 1968, Tampa
Fabricated structural steel.

Rich Auto Supply Co.
Box 2871, Orlando
Motor vehicle parts and accessories.

Rinker Materials Corp.
Drawer 231, West Palm Beach
Fabricated structural steel.

Rivers Body Factory
Box 2239, Jacksonville
Truck and bus bodies.

W. L. Rives Co.
Box 6206, Jacksonville
Metal doors.

W. R. Robbins & Son Roofing Co.
1401 N.W. 20th St., Miami
Sheet metal work.

Rubin Iron Works, Inc.
Box 3333, Jacksonville
Heavy steel plate fabrication.

Salt Creek Welding & Repair Shop
St. Petersburg
Machine shop.

Sebring Welding & Tank Co.
Park, Sebring
Heavy steel plate fabrication.

Sheet Metal Specialty Co.
573 N.W. 71st St., Miami
Sheet metal work.

Sheffield Briggs Steel Products, Inc.
7230 N.W. 2nd Ave., Miami
Fabricated structural steel.

Paul E. Shipe, Inc.
1750 N. Miami Ave., Miami
Fabricated structural steel.

Smith Steel Construction Co.
Box 2058, Jacksonville
Fabricated structural steel.

Smiths Basin & Dry Dock Co.
Box 2064, Ft. Lauderdale
Ship building.

Southern Engineering & Metal Products, Inc.
25 N.E. 17th Terrace, Miami
Stamped metal products.

Southern Industries Co.
Box M, Jacksonville
Wirework.

Southern Lighting Mfg. Co.
Box 2546, Orlando
Lighting fixtures.

Southern Propeller Co.
Bradenton
Machine shop.

Steam Ways Corp.
Box 3, Tampa
Ship building.

Super Craft Boat & Cabinet Co.
1116 Carmen, Tampa
Boat building.

Superior Engineering Corp.
Box 162, Miami
Water heaters.

Superior Window Co.
5300 N.W. 37th Ave., Miami
Metal doors.

Tampa Armature Works, Inc.
Box 1318, Tampa
Motors, generators.

Tampa Forge & Ornamental Iron Co.
212 S. Rome, Tampa
Fabricated structural steel.

Tampa Marine Co.
Box 1171, Tampa
Fabricated structural steel.

Tampa Ship Repair & Dry Dock, Inc.
Box 1277, Tampa
Ship building.

Tri-State Culvert & Mfg. Co.
440 S. Rome Ave., Tampa
Pumps and pumping equipment.

Tropical Towers, Inc.
1943 N.W. 1st St., Miami
Sheet metal work.

Unique Products, Inc.
Box 729-A, St. Petersburg
Radio, radar and television equipment.

U. S. Flying Services, Inc.
Albert Whitted Airport, St. Petersburg
Fabricated structural steel.

Ware Laboratories, Inc.
Box 1537, Miami
Metal doors.

Weld Rite Welding Works, Inc.
Union & Hendry, Ft. Myers
Machine shop.

West End Iron Works
Blountstown
Machine shop.

Wheeler's Machine Shop
Cross City
Machine shop.

White Construction & Engineering Co., Inc.
300 22nd St., S., St. Petersburg
Fabricated structural steel.

Whitmire Tank Co.
Box 6063, Jacksonville
Heavy steel plate fabrication.

H. R. Williams Machine Works
823 N. Beach, Daytona Beach
Fabricated plate and structural steel.

Yocam Batteries, Inc.
Box 1124, Tampa
Storage batteries.

Georgia

American Art Metals Co.
Atlanta
Aluminum letters, doors, designs, gages.

American Brake Shoe Foundry
Atlanta
Iron car wheels.

American Can Co.
Atlanta
Steel containers.

American Can Co.
Savannah
Metal containers.

Armco Drainage & Metal Products, Inc.
East Point
Sheet metal products, storage tanks, culverts.

Arrington Mining Co.
Cedartown
Iron ore mining.

Atlanta Metallic Casket Co.
Atlanta
Casket hardware, caskets, toy vehicle wheels.

Atlanta Steel Co.
Atlanta
Steel wire products, galvanizing forgings.

Atlanta Stove, Inc.
Atlanta
Ranges and stoves.

Atlanta Utility Works
East Point
Cotton seed oil mill machinery, fertilizers.

Augusta Iron & Steel Works, Inc.
Augusta
Steel fabrication.

Auto Lite Battery Corp.
East Point
Storage batteries.

Auto Vent Shade Co.
Atlanta
Auto accessories.

Beauty Crafts, Inc.
Atlanta
Aluminum awnings.

Blue Bird Body Co.
Fort Valley
Truck and bus bodies.

Boyette Sprayer Manufactory
Nashville
Spraying machines.

Conservative view is that Southern utilities will expand 50 pct by 1963 . . .

Butters Mfg. Co.
Atlanta
Cotton seed oil mill machinery.

Byck Electric Co.
Savannah
Sheet metal work.

C. & H. Air Conditioning Fan Co., Inc.
Atlanta
Vent equipment, electric fans.

Culvert Iron Works
Atlanta
Structural steel bridges.

Culvert Translift Corp.
Atlanta
Lifts, auxiliary devices for trucks.

E. V. Camp & Associates
Atlanta
Resilient road guard rail.

Cedar Creek Mining Co.
Cedartown
Iron ore mining.

Cedartown Foundry & Machine Co.
Cedartown
Textile parts, small parts, castings.

Cleveland Electric Co.
Atlanta
Electric equipment.

R. D. Cole Mfg. Co., Inc.
Newnan
Steel towers.

Columbus Iron Works
Columbus
Castings, ranges.

Crawford & Slaten Co.
Atlanta
Fabricating sprinkler systems, piping.

Delta Tank Mfg. Co.
Macon
Tanks.

Dixie Corp.
Rome
Aluminum extrusions.

Dixie Culvert & Metal Co.
East Point
Sheet metal products, storage tanks, culverts.

Engle Stove Works, Inc.
Rome
Stoves.

Electric Storage Battery Co.
Atlanta
Storage batteries.

Jos. B. English Co.
Atlanta
Picture frames.

Evans Metal Co.
Atlanta
Lead pipe, sheet lead, lead pipe fittings.

Fairbanks Co.
Rome
Industrial trucks.

Finley Machine Co.
Valdosta
Machine shop.

J. J. Finnigan Co., Inc.
Atlanta
Boilers, welders tanks, smoke stacks.

Fisher Body Co. of Atlanta
Atlanta
Auto bodies.

Ford Motor Co.
Hapeville
Auto assembling.

Fruehauf Trailer Co.
Atlanta
Trailers.

Furrow Gate Mfg. Co.
Atlanta
Rebuild engines, carburetors for Ford Motor Co.

Gemmage Mining Co.
Cedartown
Iron ore mining.

General Fire Extinguisher
Atlanta
Fire extinguishers.

General Motors Corp., Buick-Oldsmobile-Pontiac Div.
Doraville
Trucks, passenger cars.

General Motors Corp., Chevrolet Motor Div.
Atlanta
Assembling cars.

Georgia Iron Works Co., Inc.
Augusta
Hydraulic mining pumps.

Georgia Lead Works, Div. of National Lead Works
Atlanta
Lead products, soldering, babbiting.

Georgia Screw Products Corp.
Atlanta
Screw machine products.

Globe Union, Inc.
Atlanta
Storage batteries.

Glover Machine Works, Inc.
Marietta
Steel products, pipe, pipe fittings.

Golian Steel & Iron Co.
East Point
Structural steel, ornamental iron, fire escapes.

Graves & Acres Mining Co.
Cedartown
Iron ore mining.

Griffin Foundry & Mfg. Co.
Rome
Sewer coverings.

Grinnell Corp.
Atlanta
Sprinkler systems, heating apparatus, pipe.

Hanks Stove & Range Co., Inc.
Rome
Stoves.

Harris Foundry & Machine Co.
Cordele
Presses soil pipe, farm machinery.

Hicks Battery Mfg. Co.
Columbus
Storage batteries.

Higgins Foundry & Machine Works
Atlanta
Castings, gray iron.

Keller Machine Co.
Athens
Ribbing attachments.

LaGrange Iron Works
LaGrange
Castings.

Larkin Coils, Inc.
Atlanta
Commercial refrigeration equipment.

L. M. Leathers Sons Roofing & Sheet Metal Works
Athens
Sheet metal.

Lefkies Automotive Co.
Valdosta
Machine shop.

Lerio Corp.
Valdosta
Tin cans.

R. G. Letourneau, Inc.
Toccoa
Heavy earth moving equipment.

Lilliston Implement Co., Inc.
Albany
Farm implements.

Lockheed Aircrafts Corp.
Marietta
Airplanes.

McDonough Foundry & Machine Co., Inc.
McDonough
Farm implements, castings, machine repair parts.

Macuch Steel Products
Augusta
Ornamental iron.

Meadows Mfg. Co.
Atlanta
Textile machine parts, ball bearing assembly.

Metal Arts Mfg. Co.
Atlanta
Aluminum window sash.

Metal Fabricators
Atlanta
Sheet metal products.

Metal Products, Inc.
Valdosta
Tinware.

A. C. Miller & Co.
Atlanta
Auto truck bodies.

Miller Metals
Atlanta
Solder, babbit.

Moncrief Furnace Co.
Atlanta
Heating plants, air conditioned systems.

Monticello Bobbin Co., Inc.
Monticello
Bobbins.

Murrell Holderbys Flue Shop
Valdosta
Metal, tinware.

Nashua Mfg. Corp.
Macon
Trailers.

National Battery Co.
East Point
Storage batteries.

National Lead Co.
Atlanta
Metal alloys.

National Traffic Guard Co.
Atlanta
Guard rails.

National Wire & Iron Works
Atlanta
Wire, iron manufacturing.

New Ideal Sprayer Co.
Nashville
Sprayers, dusting machines, planters.

Norman & Romer
Atlanta
Sheet metal products.

Frank G. North, Inc.
Atlanta
Textile mill supplies.

Pekor Iron Works
Columbus
Castings, machine parts.

Pioneer Heddle & Reed Co.
Atlanta
Harness for mills.

Potter & Rayfield, Inc.
Atlanta
Brass, steel products.

Price Battery Corp.
Atlanta
Storage batteries.

Ragan Ring Co.
Atlanta
Textile rings.

Rome Plow Co., Inc.
Cedartown
Disc harrows.

Rome Stove & Range Co., Inc.
Rome
Stoves, ranges.

Textile slump during 1951-52 minimized figures showing Southern growth . . .

Russell Weill Dist. Co.
Atlanta
Auto parts.

Sallee & Co.
Atlanta
Machine screws.

Savannah Iron & Wire Works
Savannah
Ornamental iron wire work.

Savannah Machine & Foundry Co.
Savannah
Structural steel.

Simmons Plating Works
Atlanta
Retinning, plating.

Sims Metal Works
West Point
Card screens, kettles, rollers.

Southeastern Elevator Co.
Atlanta
Elevator service.

Southeastern Foundries, Inc.
Atlanta
Gray iron, brass, bronze, aluminum castings.

Southern Cooperative Foundry Co., Inc.
Name
Stoves.

Southern Iron & Equipment Co.
Atlanta
Railroad equipment.

Southern Saw Service, Inc.
Atlanta
Meat grinders.

Southern Saw Works, Inc.
East Point
Saws, drop forgings, circular knives.

Southern States Iron Roofing Co.
Savannah
Steel, aluminum roofing, steel drums.

Southern Wire & Iron Works
Atlanta
Iron works.

Southwire Co., Inc.
Carrollton
Aluminum, copper wire, cable.

Spalding Foundry Co.
Atlanta
Gray iron castings.

Steel Heddle Mfg. Co.
Atlanta
Cotton loom harness.

Steel Products Co., Inc.
Savannah
Truck trailers, steel tanks, bodies, structural steel.

Superior Aluminum Awning Co.
Atlanta
Aluminum awnings.

Taylor Iron Works Supply Co.
Macon
Castings.

Toccoa Foundry & Machine Works
Toccoa
Heavy castings.

True Temper Corp.
Macon
Agricultural implements.

Tumpane Co.
Macon
Machine shop.

USL Battery Co.
East Point
Storage batteries.

Walker Electrical Co.
Atlanta
Electric meter boxes.

Warren Co.
Atlanta
Commercial refrigerators.

Warren Cooler Corp.
Atlanta
Milk coolers.

Waycross Machine Shop
Waycross
Tools.

Whitehead Engineering Co.
Atlanta
Dies, tools, textile machine parts.

A. A. Wood & Sons Co.
Atlanta
Cotton gin, saws.

Woodman Co., Inc.
Decatur
Food packaging and closing machinery.

Kentucky

Abell Elevator Co., Inc.
630 E. Main St., Louisville
Elevators.

Also Windows of Kentucky, Inc.
339 E. Bloom St., Louisville
Aluminum windows, screens, doors.

American Air Filter Co., Inc.
215 Central Ave., Louisville
Air filters.

American Radiator & Standard Sanitary Corp.
1541 S. 7th St., Louisville
Plumbing fixtures.

American Saw & Tool Co.
121 S. Jackson St., Louisville
Saws.

Archer & Smith, Inc.
125 N. Eastern Ave., Lexington
Carbide cutting tools.

Armco Drainage & Metal Products, Inc.
5th & Greenup Ave., Ashland
Corrugated pipe, steel buildings.

Armco Steel Corp.
Box 191, Ashland
Steel sheets.

Ashland Foundry & Machine Works
Box 407, Ashland
Castings.

Atlas Tack Corp.
Atkinson & O'Byrne Sts., Henderson
Tacks, nails, brads.

Auto Vehicle Parts Co.
1018-1032 Saratoga St., Newport
Automobile body parts.

Avco Mfg. Corp., Crosley Div.
4th St., Carrollton
Radio, television cabinets.

B. F. Avery & Sons Co.
1720 S. 7th St., Louisville
Farm tractors, implements.

Avey Drilling Machine Co.
25 E. 3rd St., Covington
Drilling machines.

W. J. Baker Co.
1029 Saratoga St., Newport
Stampings, venetian blinds.

Bennett Bros.
725-727 Jefferson St., Louisville
Restaurant equipment, sheet metal work.

Blatt & Ludwig Mfg. Co.
900-906 Patterson St., Newport
Compacts, cigarette cases.

Borne Co., Inc.
1549 Kellogg Ave., Covington
Material handling equipment.

Bowling Green Mfg. Co.
Bowling Green
Carburetors.

Browning Mfg. Co.
3rd & Main Sts., Maysville
Steel pulleys.

James Cash Machine Co.
625 W. Hill St., Louisville
Textile machinery.

Castle Showcase Co.
1716 Front St., Ashland
Store fixtures.

Central Metal Products Co., Inc.
1480 S. Floyd St., Louisville
Tools, dies, stampings.

Champion Wire & Iron Works
1730 S. Brook St., Louisville
Iron, steel fabrication.

Cincinnati Shippers Supply Co.
3414 Decoursey Ave., Covington
Material handling equipment.

Cincinnati Ventilating Co.
302 Madison Ave., Covington
Sheet metal parts, tools, dies.

Clayton & Lambert Mfg. Co.
1701-15 Dixie Highway, Louisville
Hot water heaters, fire pots, blow torches.

Cochran Foil Co.
1430 S. 13th St., Louisville
Aluminum foil.

C. Lee Cook Mfg. Co., Inc.
916 S. 8th St., Louisville
Metallic packing, piston rings.

Matt. Corcoran & Co.
1355 S. 7th St., Louisville
Chemical equipment.

Deena of Arlington
Arlington
Lamps.

Donaldson Art Sign Co., Inc.
2125 Donaldson Ave., Covington
Metal signs.

Drummond Mfg. Co., Inc.
1214 W. Main St., Louisville
Gray iron castings.

Fisher-Klosterman, Inc.
2901-09 Magazine St., Louisville
Ventilating systems, sheet metal fabrication.

Fries & Son Steel Construction & Engineering Co.
2nd & Madison Ave., Covington
Steel jail equipment, cabinets.

George W. Gayle & Son
514½ Logan St., Frankfort
Stampings.

General Electric Co., Owensboro Tube Works
316 E. 9th St., Owensboro
Radio receiving tubes.

Green River Steel Corp.
Owensboro
Low-carbon, special alloy steels.

Griffin & Co.
500 Bergman Ave., Louisville
Metal fabrication.

Grote Mfg. Co., Inc.
Grote Square, Bellevue
Stampings, cabinets.

Harbison & Gathright, Inc.
709 W. Main St., Louisville
Machinery, automobile parts.

J. R. Hoe & Sons, Inc.
Middlesboro
Coal mine equipment, castings, structural steel.

Illinois Central R. R. Shops
1500 Kentucky Ave., Paducah
Locomotive, engine parts.

International Harvester Co.
Box 179, Crittenden Drive, Louisville
Tractors.

Slowing of emigration from the South means there are more opportunities . . .

Interstate Venetian Blind Co.
Lexington
Venetian blinds.

Kemper Co.
Cynthiana
Aluminum refrigerator shelves.

Kemper Co.
817 E. 3rd St., Lexington
Buildings, aluminum awnings.

Kentucky Mfg. Co.
2601 S. 3rd St., Louisville
Truck trailers, bodies, farm wagons.

Klone Foundry Co.
1545 Russell St., Covington
Castings.

Louis Metal Equipment Co., Inc.
116 S. 10th St., Louisville
Kitchen equipment.

Liberty Engineering & Mfg. Co.
1450 S. 15th St., Louisville
Ventilating systems.

Light Metals Corp.
1107 S. Preston St., Louisville
Aluminum articles.

Logan Co.
1111 Franklin St., Louisville
Conveyors, builders iron, beds.

Louisville Bridge & Iron Co.
11th & Oak Sts., Louisville
Fabricated structural steel, warehouse steel.

Louisville Cap Co.
301 S. 30th St., Louisville
Caps.

Louisville Electric Mfg. Co.
3008 Magazine St., Louisville
Lawn mowers, fractional H.P. motors, electric tools.

Magnavox Co. of Kentucky
1500 N. 8th St., Paducah
Radio, television parts.

Martin Foundry Co., Inc.
408 W. 3rd St., Covington
Gray iron castings.

Mastercraft Metals Co., Inc.
804 Clay St., Dayton
Kitchen, cafeteria, hospital equipment.

Merrimac Battery Plate Co.
315-17 Roland St., Louisville
Storage batteries.

Michaels Art Bronze Co., Inc.
231-239 Court St., Covington
Architectural metals.

Midwest Foil Co.
500 E. Main St., Louisville
Aluminum foil products.

Modern Welding Co.
1500 E. 12th St., Owensboro
Structural steel fabrication.

Muesch-Edwards Corrugating Co.
810-818 Russell St., Covington
Steel doors, sheet metal products.

T. J. Moody
1107 S. Preston St., Louisville
Aluminum products.

Mosler Lock Co.
239 Scott St., Covington
Locks for safes, jails, etc.

Murphy Elevator Co.
128 E. Main St., Louisville
Elevators.

Murphy Machine & Tool Co.
128 E. Main St., Louisville
Conversion gas burners.

National Electric Service Co.
Dayhoit, Withoit
Electric coils, mining machinery.

National Tool & Die Co., Inc.
510-12 S. Clay St., Louisville
Filing cabinets, steel trestles.

F. A. Neider Co.
207 Seminary Ave., Augusta
Stampings.

North American Refractories Co.
701 Winchester Ave., Ashland
Refractories.

Oil Equipment Mfg. Co., Inc.
3100 Vermont Ave., Louisville
Gasoline equipment, valves, etc.

Owensboro Ditcher & Grader Co.
120 10th St., Owensboro
Farm ditchers, terracers, graders.

Owensboro Forging Co.
2300 W. 2nd St., Owensboro
Small steel drop forgings.

Peerless Mfg. Corp.
1400 W. Ormsby Ave., Louisville
Gas heater equipment, fireplace fixtures.

Pittsburgh Metallurgical Co., Inc.
Calvert City
Ferroalloys.

Porcelain Metals Corp.
1400 S. 13th St., Louisville
Stampings, enameled parts.

Queen Products Co., Inc.
13th & Rowan Sts., Louisville
Electric cabinets, duct metal stampings.

Reading Brass & Aluminum Foundry, Inc.
527 W. 10th St., Newport
Nonferrous castings.

Reynolds Metals Co.
28th & Hale Sts., Louisville
Aluminum building products, powder, foil, parts.

Riemeyer Wire & Iron Works
305-307 Bakewell St., Covington
Window guards, wire partitions.

Sellers Engineering Co.
Box 336, Danville
Gas-fired boilers, heaters.

Service Welding & Machine Co., Inc.
700 E. Main St., Louisville
Steel tanks.

Shannon Spring Bed Mfg. Co., Inc.
2925 Garfield Ave., Louisville
Bed springs, beds, cots.

Sheetmetal Products
937 W. Hill St., Louisville
Bins, shelving.

Shuler Axle Co., Inc.
2901 S. 2nd St., Louisville
Axles, steel forgings, brakes.

Signal Scale & Mfg. Co., Inc.
2400 S. Brook St., Louisville
Automatic bagging scale.

Snead Architectural Iron Works, Inc.
1512 S. 10th St., Louisville
Fabricated structural steel.

Southern Tank & Mfg. Co.
1501 Haynes Ave., Owensboro
Tanks, steel fabrication.

Spring Air Co.
1503 Price Ave., Owensboro
Innerspring assemblies, box springs.

Star Foundry
221 Main St., Covington
Gray iron castings.

Stewart Iron Works Co.
17th & Madison Ave., Covington
Fence and jail equipment.

Sutton Electronic Co.
426 W. Short St., Lexington
Electronic equipment.

Tube Turns, Inc.
718 S. 28th St., Louisville
Tube-Turn welding fittings, flanges.

U. S. Hoffman Machinery Corp.
730 S. 14th St., Louisville
Dry cleaning, laundry equipment.

Vogt Bros. Mfg. Co.
1402 W. Main St., Louisville
Lawnmowers, cabinets, hydrants, valves, pumps.

Henry Vogt Machine Co.
1000 W. Ormsby Ave., Louisville
Valves, water tube boilers, refrigerating machinery.

Wadsworth Electric Mfg. Co., Inc.
20-34 W. 11th St., Covington
Safety switches, panel boards.

Wadsworth Watch Case Co.
5th & Clay Sts., Dayton
Watch cases, compacts, emblems.

Weir Sheet Iron Works
1510 W. Main St., Louisville
Steel fabrication.

Westinghouse Electric Corp.
11th & Vine Sts., Bowling Green
Photoflash lamps.

Whip-Mix Corp.
411 W. Avery Ave., Louisville
Dental equipment, precision castings.

Wil-Son Mfg. Co.
Cloverport
Infra-red oven parts.

F. Wolkow & Sons
128 W. Market St., Louisville
Metal combs.

Wuest Bros., Inc.
934 W. Hill St., Louisville
Stampings, dies.

Louisiana

A & F Tileboard Co.
Lee St. at Roy, Alexandria
Mouldings.

Air Reduction Sales Co.
1406 S. Rendon, New Orleans
Welding equipment.

Alexander Shipyard, Inc.
830 Audubon Bldg., New Orleans
Derricks.

Algiers Iron Works & Dry Docks Co.
434 Powder, New Orleans
Machine work.

American Can Co.
602 N. Cortez, New Orleans
Tin cans.

American Sheet Metal Works
Box 547, New Orleans
Doors.

Armo Drainage & Metal Products, Inc.
7625 Scenic Hwy., Baton Rouge
Steel buildings.

Avondale Marine Ways, Inc.
Westwego
Dredges.

B & M Corp.
Box 6, Houma
Awnings.

H. H. Bain Roofing Co., Inc.
815 Milam, Shreveport
Air conditioning equipment.

Bar-Brook Mfg. Co., Inc.
6133 Linwood Ave., Shreveport
Fans.

Bayou Welding Works
Box 78, New Iberia
Welding.

Southern statistical surveys made more than a few years ago are obsolete . . .

J. B. Beaird Co., Inc.
6200 Saint Vincent Ave., Shreveport
Tank equipment.

Bishop-Edell Machine & Electrical Works
1008 Magazine, New Orleans
Machine work.

Boland Machine & Mfg. Co., Inc.
1000 Tchoupitoulas, New Orleans
Slings, chains, bailers, hoists.

Brewster Co., Inc.
N. Market St., Shreveport
Drilling and production equipment.

H. Brown's Garage & Iron Works
Box 242, Eunice
Machine work.

Leo Cafiero, Inc.
621 Lessard, Donaldsonville
Machine work.

Calmes Engineering Co.
708 Baronne, New Orleans
Derricks.

Canulette Shipbuilding Co., Inc.
Slidell
Machine work.

Castagnos Cane Loader Co., Inc.
1003 Lafourche, Donaldsonville
Loaders, stubble shavers, hoisting units.

Central Culvert Corp.
411 Guaranty Bank Bldg., Alexandria
Culverts.

Continental Can Co., Inc.
River Road, Harvey
Containers.

Crescent Bed Co., Inc.
600 S. Broad, New Orleans
Brass, iron, steel bedsteads.

Cunningham Machinery Corp.
700 Ricou, Shreveport
Sawmill machinery.

Delta Pipe & Boiler Co.
5002 Jefferson Hwy., New Orleans
Pipe.

Dibert, Bancroft & Ross Co., Ltd.
3400 Tulane Ave., New Orleans
Brass, iron, steel castings.

Dixie Machine Welding & Metal Works, Inc.
1031 Annunciation, New Orleans
Machine work.

Dunham-Wilson Co., Inc.
Box 748, Baton Rouge
Culverts.

E. W. & A. P. Dupont, Inc.
Box 62, Scott
Oilfield equipment.

Charles F. Elchinger
916 Magazine, New Orleans
Castings.

Equitable Equipment Co., Inc.
410 Camp, New Orleans
Dredges.

Fauria Awning & Shade Co.
1216 Royal, New Orleans
Venetian blinds.

Favrot Roofing & Supply Co.
3511 Toulouse, New Orleans
Sheet metal work.

Foster Mfg. Co., Inc.
Greenwood Rd., Shreveport
House trailers.

Frymaster Corp.
460 Fortson, Shreveport
Doughnut machinery.

Gretna Machine & Iron Works
Box 215, Harvey
Machine work.

Guest Sheet Metal Works
827 Dryades, New Orleans
Gutters, downspouts, ducts, ventilators.

Gulf Engineering Co., Inc.
1000 S. Peters, New Orleans
Steam condensers.

Gullet Gin Co.
901 E. Railroad Ave., Amite
Cotton gin equipment and machinery.

Ike Haggard Machine Works
Box 386, Harvey
Houses.

Hendrix Mfg. Co.
Box 31, Mansfield
Dragline buckets.

Hepinstall Steel Works, Inc.
600 Market, New Orleans
Machine work.

Higgins, Inc.
Box 8001, New Orleans
Water distillation units.

Hunt Tool Co.
1114 N. Main, Jennings
Oil field equipment.

Industrial Steel Products Co., Inc.
Box 1814, Shreveport
Steel fabricating.

Inland Steel Container Co.
325 N. Cortez, New Orleans
Buckets.

J & L Steel Barrel Co.
5008 Jefferson Hwy., New Orleans
Drums.

James Machine Works
1601 DeSiard, Monroe
Machinery.

Johns-Manville Products Corp., Industrial Prods. Div.
Marrero
Transit pipe.

Jones & Laughlin Steel Corp.
Industrial Canal, New Orleans
Steel fabricating.

Kaiser Aluminum & Chemical Corp.
Box 1031, Baton Rouge
Alumina.

Kansas City Bridge Co.
Box 473, Plaquemine
Steel buildings.

Kihnel's Sheet Metal Works
814 Main, Franklin
Cisterns.

Leonard Krower & Son, Inc.
111 Exchange Pl., New Orleans
Plating.

Laclede Steel Co.
Box 8013, New Orleans
Steel joists.

LeBlanc Co., Inc.
Box 270, Donaldsonville
Castings.

A. M. Lockett & Co., Ltd.
308 Whitney Bldg., New Orleans
Oil burners.

Lundin-Hendry, Inc.
Box 2027, Baton Rouge
Louvers, ventilators, guttering, ducts, hoods.

Matthews Roofing & Sheet Metal Works
4280 Government, Baton Rouge
Air conditioning equipment.

Mechanical Equipment Co., Inc.
861 Carondelet, New Orleans
Water distillation units.

Mid-Continent Steel Casting Corp.
Box 398, Cedar Grove Station, Shreveport
Castings.

Modern Iron Works
3002 Mansfield Road, Shreveport
Sawmill edgers, trimmers, feed tables, ditcher.

Moran Tank Co., Inc.
New Mooringsport Road, Shreveport
Hot dip galvanizing.

Motor Rebuilders, Inc.
7300 N. Peters, Arabi
Rebuilt Ford engines.

W. C. Nabors Co.
Mansfield
Truck, van bodies.

Nadler Foundry & Machine Co., Inc.
Plaquemine
Evaporators, farm implements, castings.

National Blow Pipe & Mfg. Co.
1610 Kentucky, New Orleans
Metal awnings.

New Orleans Armature Works
2311 Tchoupitoulas, New Orleans
Electric equipment.

Orleans Materials & Equipment Co., Inc.
1556 Tchoupitoulas, New Orleans
Iron products.

Pearce Foundry & Machine Works, Inc.
210 South Blvd., Baton Rouge
Brass, gray iron, municipal, industrial castings.

Pellerin Milnor Corp.
8000 Edinburgh, New Orleans
Laundry equipment and machinery.

Poulan Mfg. Corp.
4623 Greenwood Road, Shreveport
Power chain saws and parts.

Poulan Saw Co., Inc.
Box 3524, Shreveport
Speed saw.

J. R. Quaid, Inc.
528 Freret, New Orleans
Fencing.

Red Fox Machine & Supply Co.
Box 552, New Iberia
Oil field equipment.

Reed Unit-Fans, Inc.
1001 St. Charles, New Orleans
Window fans.

Rheem Mfg. Co.
5001 Jefferson Hwy., New Orleans
Steel containers.

B. A. Rothschild Boiler & Tank Works
1835 Grimmert, Shreveport
Boilers.

St. Mary Iron Works
Box 581, Franklin
Steel buildings.

Schaller Steel Works, Inc.
Box 8116, New Orleans
Condensers.

Service Foundry, Inc.
416 Erato, New Orleans
Aluminum, brass, bronze, gray iron castings.

Service Machine & Iron Works, Inc.
1047 Magazine, New Orleans
Machine work.

Sewart Machine Works
Berwick
Shrimp washers, conveyors.

Shreveport Blow Pipe Co.
1 Strand St., Shreveport
Blowers.

Simplex Mfg. Corp.
540 N. Carrollton Ave., New Orleans
Motorcycles, parts.

Southern Metal Products Corp.
2220 Calliope, New Orleans
Metal stampings.

Southern States Iron Roofing Co.
Box 5306, Station B, New Orleans
Sirco roofing.

Stamm-Scheele, Inc.
Rayne
Machine work.

Steel Fabricators, Inc.
1501 S. Peters, New Orleans
Ornamental iron.

The Southeast is one of the best potential markets for air conditioners . . .

Superior Iron Works & Supply Co., Inc.
1202 Marshall, Shreveport
Oil, gas well machinery.

Tractor Corp.
Baldwin
Sugar cane machinery.

Thomson Machinery Co., Inc.
Thibodaux
School buses.

Thurston Grab & Derrick Works, Inc.
Jonestown
Harvesters, tractor attachments, derricks.

Transportation Equipment Co., Inc.
Box 10036, New Orleans
Truck bodies.

U. S. Steel Products Co., Bennett Mfg. Div.
Jefferson Hwy., New Orleans
Steel containers.

Wabco Steel Co.
Box 1441, Baton Rouge
Steel fabricating.

Welding & Mfg. Co.
1840 S. Peters, New Orleans
Dredges, winches, buckets, hoists.

Wich-Lift, Inc.
Sibley Road, Minden
Dump bodies.

Wich-Lift Trailer Co.
208 Pine, Minden
Trailers.

Wm. Welding & Dragline Buckets, Inc.
2120 N. Third, Baton Rouge
Buckets.

Day-Brite Lighting Co., Inc.
Tupelo
Lighting fixtures.

Delta Mfg. Co.
Clarksdale
Heaters.

Dill & Norris
Columbus
Sheet metal work.

Finklea Implement Co.
Leland
Farm equipment.

Gotcher Engineering & Mfg. Co.
Clarksdale
Farm machinery.

Greenville Mfg. & Machine Works
Greenville
Fabricated steel products.

Harper's Foundry & Machine Co.
Jackson
Foundry products.

Ingalls Ship Building Corp.
Pascagoula
Ships, barges, structural plates.

J. & M. Products Co.
Jackson
Carburetors.

Johnston Lawn Mower Corp.
Brookhaven
Hand, power lawn mowers.

Komp Equipment Co.
Hattiesburg
Casings (oil exploration equipment).

Laurel Machine & Foundry
Laurel
Machine work, castings.

Leland Mfg. Co., Inc.
Leland
Farm machinery.

LeTourneau Co.
Vicksburg
Heavy machinery.

McDade's Roofing & Sheet Metal Works
Jackson
Gutters, ducts, sheet metal works.

McMillan Welding & Machine Works
Greenville
Fabricated steel products, plows.

M. R. S. Mfg. Co.
Flora
Hauling units, wheel tractors.

M. System Mfg. Co., Inc.
Vicksburg
Auto house trailers.

Metal Trims
Jackson
Extruded aluminum products.

Mills-Morris Co.
Jackson
Sheet metal products.

Miner Saw Works
Meridian
Saws.

Mississippi Steel & Iron Co.
Jackson
Structural steel products.

Mitchell Engineering Co.
Columbus
Steel products.

Motor Parts Co.
Calhoun City
Screw machine work.

Multi-Purpose Mfg. Co.
Columbus
Farm machinery.

Noel's Auto Electric Service
Jackson
Generators, motors.

Oliver Iron & Steel, Inc., Berry Div.
Corinth
Hydraulic pumps.

Poplarville Implement Co.
Poplarville
Harrows, farm equipment.

Regan Tool Co.
Natchez
Machinery, machine tools.

Rockett Steel Works
Jackson
Steel tanks, structural shapes.

Rockwell Mfg. Co.
Tupelo
Small power tools.

Screw Conveyor Corp.
Winona
Materials handling equipment.

Soule Steam Feed Works
Meridian
Saw mill specialties.

Southern Implement Mfg. Co.
Clarksdale
Farm implements.

Southern Parts Co.
Okolona
Generators.

Standard Roofing & Siding Co.
Jackson
Sheet metal work.

Stewart Dura-Van Co.
Picaune
Truck bodies.

Stewart Tank Works
Picaune
Pressure, storage tanks for butane.

Superior Coach Corp., Pathfinder Div.
Kosciusko
School bus bodies.

Talon, Inc.
Morton
Slide fasteners.

Taylor Machine Works, Inc.
Louisville
Farm machinery, logging equipment.

Tipps Tool Co.
Laurel
Steel products.

Union Fork & Hoe Co.
Jackson
Farm implements, handles.

Vicksburg Tank Co.
Vicksburg
Steel tanks.

Westbrook Mfg. Co.
Jackson
Store, restaurant fixtures.

Westinghouse Electric Corp.
Vicksburg
Lighting fixtures.

Yazoo Mfg. Co.
Jackson
Power lawn mowers.

Mississippi

Alexander Mfg. Co.
Picaune
Farm machinery.

Animal Trap Co. of Miss.
Pascagoula
Steel traps, devos, fur stretchers.

R. G. Avery Body Co.
Jackson
Truck bodies, station wagon parts.

Babcock & Wilcox
West Point
Steam boilers.

Bertrine Mfg. Co.
Greenwood
Grain rollers, section harrows, stalk cutters.

Binks-Noble Auto Parts & Machine Co.
Jackson
Machinery, machine work.

Burlett Sheet Metal Works
Hattiesburg
Awings, ventilators, sheet metal products.

Clark-Burt Roofing Co.
Jackson
Gutters.

Columbus Marble Works
Columbus
Auto plates.

Corinth Machinery Co.
Corinth
Sawmill machinery, gray iron castings.

Craft Steel Products
McComb
Aluminum casement windows.

North Carolina

Acme Engineering Co., Inc.
Box 2279, Greensboro
Medical instruments.

Acme Homes Metal Works, Inc.
Box 505, Statesville
Hardware.

In the last 13 yrs, the South's kilowatt capacity has increased 148 pct ...

Acme Machine & Tool Co.
2601 Wilkinson Blvd., Charlotte
Textile machinery.

Acme Mfg. Co., Inc.
Box 506, Brevard
Tractors.

Allen Machine Works
Box 694, Greensboro
Textile machinery.

Allred Metal Stamping Works
311 E. Green St., High Point
Stamped and pressed metal products.

American Potato Dryers, Inc.
510 Glenwood Ave., Raleigh
Agricultural machinery.

American Textile Sheet Metal Works
Dallas
Textile machinery.

Asheboro Machine & Foundry Co.
217 White Oak St., Asheboro
Gray iron castings.

Asheville Machine & Foundry Co.
Box 691, Asheville
Mechanical power-transmission equipment.

Asheville Steel & Salvage Co.
Box 691, Asheville
Fabricated structural steel.

Ashworth Bros., Inc.
Box 1463, Charlotte
Textile machinery.

Automatic Lathe Cutterhead Co.
Box 1790, High Point
Woodworking machinery.

Auto Spring Co.
1323 N. Liberty St., Winston-Salem
Steel springs.

Bahnsen Co.
1001 S. Marshall St., Winston-Salem
Refrigerators, air conditioning units.

Barbour Boat Works, Inc.
Box 671, New Bern
Ship building.

Barger-Ashe Roofing Co.
Box 642, Lenoir
Refrigerators, air conditioning units.

Barkley Machine Works
Box 469, Gastonia
Textile machinery.

Sid Barnett's Machine Shop
Pisgah Forest
Machine shop.

Bassick Co., Sack Div.
Box 613, Winston-Salem
Hardware.

J. T. Beaty Machine Co.
Box 2061, Charlotte
General industrial machinery and equipment.

V. E. Bell & Sons
1920 Perry St., Durham
Sheet metal work.

Beveridge Reneedling Co.
Box 1316, Gastonia
Textile machinery.

F. K. Biggs Flue Co.
Box 671, Lumberton
Sheet metal work.

Bishop's, Inc.
425 Biltmore Ave., Asheville
Sheet metal work.

Black's Gray Iron Foundry
Box 931, Gastonia
Gray iron castings.

Boney Machine Co.
Box 350, Kinston
Machine shop.

R. H. Bouligny, Inc.
Box 2115, Charlotte
Machine shop.

L. W. Bowden & Son
305 S. Bloodworth St., Raleigh
Sheet metal work.

Bradley Flyer & Repair Co.
1314 W. Second Ave., Gastonia
Textile machinery.

Briggs-Shaffner Co.
Box 188, Salem Station, Winston-Salem
Gray iron castings.

Brinson Machine & Ways, Inc.
210 Craven St., New Bern
Machine shop.

Brown-Dynalube Mfg. Co.
Box 866, Charlotte
General industrial machinery and equipment.

Brown Equipment & Mfg. Co.
Box 1049, Charlotte
Truck trailers.

Brown Machine Co.
Box 26, Elkin
Agricultural machinery.

W. A. Brown & Son, Inc.
Box 1408, Salisbury
Refrigerators, air conditioning units.

Brown Truck & Trailer Mfg. Co., Inc.
Box 1281
Truck trailers.

Budd-Piper Roofing Co., Inc.
Box 708, Durham
Sheet metal work.

Buffalo Tank Corp.
Box 5265, Charlotte
Boiler shop products.

Burlington Engineering Co., Inc.
Harden & Elm Sts., Graham
Textile machinery.

Butler Mfg. Co., Inc.
Box 1024, Charlotte
Lighting fixtures.

Carolina Aluminum Co.
Badin
Primary refining of aluminum.

Carolina Blower Co., Inc.
Box 823, Greensboro
Blowers, exhaust and ventilating fans.

Carolina Equipment Sales Corp.
Box 1438, Charlotte
Truck and bus bodies.

Carolina Loom Reed Co.
1000 S. Elm St., Greensboro
Textile machinery.

Carolina Machine Works
Box 823, High Point
Woodworking machinery.

Carolina Machinery Co., Inc.
Box 1922, Charlotte
Textile machinery.

Carolina Metal Products, Inc.
Box 1924, Charlotte
Public building and related furniture.

Carolina Roller Shop, Inc.
Lincolnton
Textile machinery.

Carolina Sashweight Co., Inc.
Box 143, Sanford
Gray iron castings.

Carolina Sheet Metal Works
Box 1008, Asheville
Sheet metal work.

Carolina Spring Corp.
Box 1833, High Point
Wirework.

Carolina Steel & Iron Co.
Box F, Greensboro
Fabricated structural steel.

Carolina Textile Engraving Co., Inc.
Box 1816, Charlotte
Engraving on metal.

Carolina Tool & Die Co.
Box 1298, Charlotte
Machine tool accessories.

Carter Traveler Co.
Box 237, Gastonia
Textile machinery.

Charlotte Ornamental Iron Works
Box 5148, Charlotte
Fabricated structural steel.

Charlotte Pipe & Foundry Co.
902 Commercial Bank, Charlotte
Gray iron castings.

Charlotte Tank Co.
Box 8037, Charlotte
Boiler shop products.

Cherryville Foundry Works
Box 676, Cherryville
Gray iron castings.

Cilley Foundry & Machine Co.
Box 408, Hickory
Textile machinery.

Cocker Machine & Foundry Co.
Box 431, Gastonia
Textile machinery.

Cole Mfg. Co.
1436 Central Ave., Charlotte
Agricultural machinery.

Concrete Machinery Co.
Box 2248, Hickory
Special industry machinery.

Cook Body Co., Inc.
2433 Wilkinson Blvd., Charlotte
Truck and bus bodies.

Corbitt Co.
Henderson
Motor vehicles.

Council Tool Co., Inc.
Wanamish
Edge tools.

A. G. Cox Mfg. Co.
Winterville
Agricultural machinery.

Leon O. Cox & Sons
Box 237, Grifton
Agricultural machinery.

William Crabb & Co.
Box 95, Black Mountain
Textile machinery.

Craig & Buchanan Loom Reed Co.
Box 1685, Greensboro
Textile machinery.

C. E. Craver & Son
Yadkinville
Truck and bus bodies.

H. E. Crawford Co.
Box 427, Kernersville
Textile machinery.

Crescent Co.
Box 582, Hickory
Textile machinery.

Dallas Roller Covering Shop
Box 225, Dallas
Textile machinery.

Dave Steel Co., Inc.
Box 2630, Asheville
Fabricated structural steel.

Davidson Engineering Co., Inc.
Box 2941
Conveyors, conveying equipment.

DeLuxe Saw & Tool Co.
415 E. Commerce St., High Point
Hand saws, saw blades.

Dennison Machine Tool Co., Inc.
Box 2251, Hickory
Machine tool accessories.

Dependable Machine Co., Inc.
Box 839, Greensboro
Woodworking machinery.

Southern steel competition will be keener as more warehouses are set up . . .

Little Parts Mfg. Co.
Box 921, High Point
Metal household furniture.

Little Roofing Co.
Box 2259, Greensboro
Sheet metal work.

Little Spindle & Flyer Co., Inc.
Box 191, Charlotte
Textile machinery.

Little Textile Machine Co.
Box 875, Greensboro
Textile machinery.

Little Textile Sheet Metal, Inc.
614 E. Franklin Ave., Gastonia
Textile machinery.

Dockery Mfg. Co., Inc.
Box 87, Rockingham
Fabricated structural steel.

Draco Furnace Co., Inc.
Morris Field, Charlotte
Oil burners.

Dunnagan & Rideout, Inc.
Box 2075, Winston-Salem
Sheet metal work.

Eli's Sheet Metal Works
Box 1029, Albemarle
Sheet metal work.

Elizabeth City Shipyard, Inc.
Box 559, Elizabeth City
Ship building.

Emmons Loom Harness Co.
Box 2036, Charlotte
Textile machinery.

Eitel Textile Supply Co.
Lee Ave., Lincolnton
Industrial trucks, tractors, trailers, stackers.

Ferguson Gear Co.
Box 511, Gastonia
Mechanical power-transmission equipment.

Florence-Mayo Nuway Co.
Way & Belcher Sts., Farmville
Oil burners.

Ford Body Co., Inc.
1200 Battleground Ave., Greensboro
Truck trailers.

Ford Moulding Co.
Kenmore Ave., Louisburg
Metal doors.

H. A. Garrison Brass Foundry
316 Lincoln St., Charlotte
Nonferrous castings.

Gaston County Dyeing Machine Co.
Stanley
Textile machinery.

Gastonia Roller Flyer & Spindle Co., Inc.
Box 2818, Gastonia
Textile machinery.

Gastonia Textile Machinery Co.
Box 351, Gastonia
Textile machinery.

Gastonia Textile Sheet Metal Works, Inc.
Box 129, Gastonia
Textile machinery.

General Foundry & Machine Co.
202 Maple Ave., Sanford
Agricultural machinery.

General Metals, Inc.
Box 448, Greensboro
Sheet metal work.

General Steel Products Co.
1421 Tryon St., High Point
Hardware.

Gibbs Machine Co.
Box 1323, Greensboro
Machine shop.

Glascock Stove & Mfg. Co.
Box 510, Greensboro
Heating and cooking apparatus.

Goldsboro Tin Shop, Inc.
Box 497, Goldsboro
Sheet metal work.

Gossett Machine Works, Inc.
Box 979, Gastonia
Textile machinery.

Greensboro Loom Reed Co.
Box 1375, Greensboro
Textile machinery.

Greensboro Metal Awning Co., Inc.
Box 2245, Greensboro
Sheet metal work.

A. F. Grigg Sheet Metal Works
Box 855, Gastonia
Sheet metal work.

Guilford Foundry Co.
Fulton St., Greensboro
Gray iron castings.

Hackney Bros. Body Co., Inc.
Wilson
Truck and bus bodies.

J. A. Hackney & Son
Box 64, Washington
Truck and bus bodies.

Hackney Wagon Co., Inc.
Box 638, Wilson
Transportation equipment.

Hallman Foundry Co.
Box 628, Sanford
Gray iron castings.

Hamlin Mfg. Co.
Box 914, Greensboro
Electroplating, plating, polishing.

Hanover Iron Works
Box 1088, Wilmington
Sheet metal work.

John T. Hardaker, Inc.
Box 3125, Charlotte
Textile machinery.

C. L. Hardy Curing Corp.
Maury
Oil burners.

Hardy & Newsom, Inc.
Box F, La Grange
Agricultural machinery.

Harrington Mfg. Co., Inc.
Lewiston
Agricultural machinery.

Harrison Machine Shop
Box 226, Kings Mountain
Mechanical power-transmission equipment.

Hercules Machine Works
Box 158, Greensboro
Textile machinery.

Hewitt Roller & Leather Works
8 S. Broadway, Forest City
Textile machinery.

Hickory Foundry & Machine Co.
26 10th St. S.W., Hickory
Gray iron castings.

Hickory Springs Mfg. Co., Inc.
Box 2392, Hickory
Wirework.

Hickory Steel & Iron Co.
Box 542, Hickory
Fabricated structural steel.

High Point Boiler & Tank Co., Inc.
2401 English St., High Point
Boiler shop products.

W. M. Hopkins & Sons Roller Shop
Box 856, Burlington
Textile machinery.

Houtz & Barwick
Box 225, Elizabeth City
Metal household furniture.

Ideal Machine Shops, Inc.
Box 68, Bessemer City
Textile machinery.

Ideal Roller Covering Shop
Box 192, Gastonia
Textile machinery.

Industrial Metal Alloy Co.
Box 571, Winston-Salem
Smelting and refining of nonferrous metals, alloys.

Industrial Steel Co., Inc.
Box 1832, Charlotte
Fabricated structural steel.

W. F. Isley & Co.
322-24 Lindsay St., Greensboro
Printing-trades machinery and equipment.

W. G. Jarrell Machine Co.
Box 2154, Charlotte
Machine shop.

Jenkins Metal Shops
Box 206, Gastonia
Textile machinery.

Jenkins-Pearsall Machine Works
Box 886, Rocky Mount
Machine shop.

Jenkins RENEEDLING Co., Inc.
Box 973, Gastonia
Textile machinery.

Johnson Hinge Co.
Box 1150, High Point
Hardware.

Kanoy & Sons Machine Co.
4111 Thrift Road, Charlotte
Machine tool accessories.

Keesler Foundry Co.
Box 183, Salem Station, Winston-Salem
Gray iron castings.

Kellam Foundry
509 Russell St., High Point
Gray iron castings.

Kelley Iron Works
Box 381, Charlotte
Commercial laundry machines.

Ketchie-Houston Machine Co.
Box 1, Kannapolis
Machine shop.

Kings Mountain Foundry
Box 902, Gastonia
Gray iron castings.

Kings Mountain Tin Shop
Kings Mountain
Sheet metal work.

King's Roofing & Mfg. Co.
Box 1049, Sanford
Sheet metal work.

Kistler Iron Works
Box 105, Lincolnton
Gray iron castings.

Kittrell Machine Shop
311 E. Fifth St., Lumberton
Oil burners.

Klutz Machine & Foundry Co.
Box 71, Gastonia
Gray iron castings.

J. M. Lancaster, Inc.
Box 962, High Point
Woodworking machinery.

Laurinburg Machine Co.
404 McLaurin Ave., Laurinburg
Machine shop.

W. D. Lewis Textile Machinery Co.
Box 826, Gastonia
Textile machinery.

Linberry Foundry & Machine Co., Inc.
North Wilkesboro
Gray iron castings.

Long Mfg. Co., Inc.
1907 N. Main St., Tarboro
Agricultural machinery.

Lynch Mfg. Co., Inc.
Box 507, Dunn
Agricultural machinery.

A strong, aggressive industrial leadership has emerged from the South . . .

John McArthur Tin Shop
W. Graham St., Shelby
Sheet metal work.

John A. McKay Mfg. Co.
Box 191, Dunn
Agricultural machinery.

McKelvie Machine Co.
Box 861, Gastonia
Textile machinery.

McRary & Son, Inc.
198 Clingman Ave., Asheville
Machine shop.

Macomson Machine Co.
Box 1400, Shelby
Textile machinery.

Marion Machine Co., Inc.
Box 352, Marion
Woodworking machinery.

Maynor Ornamental Iron & Steel Works
Gastonia
Fabricated structural steel.

Meadows Mill Co., Inc.
Box 151, North Wilkesboro
Woodworking machinery.

Mecklenburg Iron Works, Inc.
Box 599, Charlotte
Fabricated structural steel.

Merritt Machine Shop
Box 310, Mount Airy
Machine shop.

Metal Bed Rail Co., Inc.
Box 13, Lexington
Fabricated structural steel.

Met-L-Vent
208 S. McDowell St., Charlotte
Sheet metal work.

W. F. Mickey Body Co., Inc.
Box 134, High Point
Truck and bus bodies.

Miles Jennings, Inc.
Box 183, Elizabeth City
Machine shop.

Mill Devices Co.
Box 237, Gastonia
Textile machinery.

Miller Equipment Co., Inc.
Box 1566, Salisbury
Special industry machinery.

Mitcham & Co.
Box 271, Gastonia
Textile machinery.

Mitchell & Becker Co., Inc.
1916 S. Blvd., Charlotte
Fabricated structural steel.

Modern Foundry Co.
Box 833, Fayetteville
Gray iron castings.

Monarch Elevator & Machine Co., Inc.
Box 2910, Greensboro
Elevators, escalators.

Mooresville Iron Works
252 N. Main St., Mooresville
Textile machinery.

Morehead City Yacht Basin, Inc.
4th & Fisher Sts., Morehead City
Boat building.

Murphy Body Works, Inc.
310 Herring Ave., Wilson
Truck and bus bodies.

Newman Machine Co., Inc.
Box 20, Greensboro
Woodworking machinery.

M. M. Nixon Mfg. Co.
Rt. 1, Edenton
Agricultural machinery.

Norlander-Young Machine Co.
Box 884, Gastonia
Textile machinery.

North Carolina Metal Products Co.
619 W. Green St., High Point
Engines.

P & R, Inc.
225 E. Tremont Ave., Charlotte
Industrial controls.

Park Mfg. Co.
Box 3097, Charlotte
Elevators, escalators.

S. B. Parker Co., Inc.
Box 549, New Bern
Sheet metal work.

Parks-Cramer Co.
Box 946, Charlotte
Textile machinery.

Peden Steel Co.
512 W. Hargett St., Raleigh
Fabricated structural steel.

Pender Mfg. & Supply Co.
1520 N. Blount St., Raleigh
Agricultural machinery.

Perfecting Service Co.
332 Atandt Ave., Charlotte
Machine shop.

Petty Machine Co.
612 E. Franklin Ave., Gastonia
Textile machinery.

Phillips Fisheries
Morehead City
Boat building.

Piedmont Iron Works
Box 858, Gastonia
Gray iron castings.

Piedmont Machine Shop, Inc.
616 E. Franklin Ave., Gastonia
Textile machinery.

Piedmont Wagon & Mfg. Co.
Box 440, Hickory
Transportation equipment.

Pifer Industries, Inc.
Box 829, Durham
Fabricated metal products.

Pneumafil Corp.
2516 Wilkinson Blvd., Charlotte
Textile machinery.

Jerome Polick Sons Co.
Box 266, Conover
Truck and bus bodies.

Pomona Foundry Co., Inc.
Pomona
Gray iron castings.

Port City Iron Works
5th & Kidder Sts., Wilmington
Machine shop.

Post Machinery Co.
Box 4277, Asheville
Machine shop.

Precision Gear & Machine Co.
Box 1153, Charlotte
Textile machinery.

Pres-On Switch Co., Inc.
649 Waightown St., Winston-Salem
Industrial controls.

Queen City Foundry, Inc.
627 S. Cedar St., Charlotte
Gray iron castings.

R. & W. Engineering Corp.
Box 2329, Hickory
Special industry machinery.

Rayfield & Stewart, Inc.
1314 W. 2nd St., Gastonia
Textile machinery.

Reco Tanks, Inc.
Box 3155, Greensboro
Boiler shop products.

Retreading Equipment Co.
Box 1246, Charlotte
Special industry machinery.

Riverside Iron Works
Box 292, New Bern
Gray iron castings.

Roberts Co.
Box 931, Sanford
Textile machinery.

Rock Bit Sales & Service Co.
350 Depot St., Asheville
Hand tools.

E. F. Rose & Co.
E. Main St., Maiden
Textile machinery.

Saco-Lowell Shops
Sanford
Textile machinery.

Salem Steel Co.
Box 2091, Winston-Salem
Fabricated structural steel.

Salisbury Iron Works, Inc.
Box 15, Salisbury
Gray iron castings.

Sanders Co.
Elizabeth City
Machine shops.

Shelby Foundry & Machine Co.
Shelby
Textile machinery.

Sherrill Machine Shop
Box 56, Troutman
Woodworking machinery.

E. E. Smith & Son
Box 164, Gastonia
Textile machinery.

Smith Textile Apron Co.
Box 664, Gastonia
Textile machinery.

Smith's Heating, Inc.
Box 865, Kinston
Oil burners.

Soule Steel & Iron Co.
Box 704, Charlotte
Fabricated structural steel.

Southern Electrical Equipment Co.
Box 3244, Charlotte
Industrial controls.

Southern Engineering Co.
Box 1087, Charlotte
Fabricated structural steel.

Southern Fixture Mfg. Co.
Box 245, Greensboro
Refrigerators, air conditioning units.

Southern Foundry Co., Inc.
Box 2362, Raleigh
Gray iron castings.

Southern Screw Co.
Box 68, Statesville
Bolts, nuts, washers, rivets.

Southern Spindle & Flyer Co.
Box 1535, Charlotte
Textile machinery.

Southern States Iron Roofing Co.
Box 1590, Raleigh
Fabricated structural steel.

Southern Steel Stampings, Inc.
Box 38, Salem Sta., Winston-Salem
Stamped and pressed metal products.

A. C. Spainhour Roofing & Sheet Metal Contr.
Box 1234, Winston-Salem
Sheet metal work.

Squeegee Pump Co.
Box 931, Sanford
Agricultural machinery.

Standard Designers, Inc.
Box 6218, W. Asheville
Special industry machinery.

Standard Foundry & Machine Co.
Box 116, Rockingham
Gray iron castings.

As its markets mushroom, the South is becoming its own best customer . . .

Steel Industries, Inc.
Box 285, Wilmington
Boiler shop products.

J. C. Steele & Sons, Inc.
Box 951, Statesville
Special industry machinery.

Paul Stewart Machine Co.
Box 14, Gastonia
Textile machinery.

Stewart Machine Co., Inc.
Box 1161, Gastonia
Textile machinery.

Stegan Line Tools, Inc.
Box 70, Conover
Hand tools.

Superior Bolster Co.
Box 1040, Gastonia
Textile machinery.

Waller Foundry & Machine Co.
Box 1178, Burlington
Gray iron castings.

Valley Laundry Machinery Co.
Box 493, Greensboro
Commercial laundry machines.

Terrill Machine Co., Inc.
Box 928, Charlotte
Textile machinery.

Textile Machine Works
Fayetteville St., Asheboro
Textile machinery.

Textile Parts & Machine Co., Inc.
Box 2615, Gastonia
Textile machinery.

Textile Specialty Co., Inc.
Box 1297, Greensboro
Textile machinery.

J. A. Tharrington & Sons
1539 S. Church St., Rocky Mount
Oil burners.

Perley A. Thomas Car Works, Inc.
Box 1849, High Point
Truck and bus bodies.

Thornburg Machine Shop
S. Aspen St., Lincolnton
Machine shop.

Todd-Long Picker Apron Co.
Box 707, Gastonia
Textile machinery.

Tool Service Engineering Co., Inc.
Box 425, Monroe
Machine tool accessories.

Triangle Body Works
2014 Waughtown St., Winston-Salem
Truck and bus bodies.

Tray Whitehead Machinery Co.
Box 1245, Charlotte
Textile machinery.

Truitt Mfg. Co.
Box 71, Greensboro
Fabricated structural steel.

Turner Equipment Co.
Box 771, Goldsboro
Boiler shop products.

Turner Mfg. Co.
Box 987, Statesville
Agricultural machinery.

J. A. Vance Co.
Box 450, Winston-Salem
Woodworking machinery.

Henry Vann Industries, Inc.
Box 490, Clinton
Oil burners.

Wasomer Mfg. Co., Inc.
Rt. 1, Gibsonville
Special industry machinery.

WAX Industries
1814 S. Tryon St., Charlotte
Textile machinery.

Wall Foundry & Machine Co.
Box 580, Lenoir
Gray iron castings.

Wall Mfg. Co.
Box 5006, Winston-Salem
Truck and bus bodies.

Wayne Agricultural Works, Inc.
Box 1006, Goldsboro
Agricultural machinery.

Whitin Machine Works
Box 1889, Charlotte
Textile machinery.

A. J. Whittemore & Son, Inc.
Box 1306, Burlington
Textile machinery.

J. D. Wilkins Co.
Box 1288, Greensboro
Fabricated structural steel.

Willard Smelting Co., Inc.
Box 3193, Charlotte
Smelting and refining of nonferrous metals, alloys.

Wilmington Iron Works, Inc.
Box 329, Wilmington
General industrial machinery and equipment.

Winston Lead Smelting Co.
Box 729, Winston-Salem
Smelting and refining of nonferrous metals, alloys.

Wix Accessories Corp.
Ozark Ave., Gastonia
Motor vehicle parts and accessories.

Wright Machinery Co.
Box 2211, Durham
Food products machinery.

Wysong & Miles Co.
Box 748, Greensboro
Metalworking machinery.

J. Zagora Machine & Gear Co.
1327 S. Mint St.
Mechanical power-transmission equipment.

Charleston Shipyards, Inc.
Charleston
Ship building.

Earl Delay & Co.
Columbia
Sheet metal, roofing.

Draper Corp.
Spartanburg
Textile machinery parts.

Eagle Iron Works
Greenville
Textile repair and maintenance parts.

Electrical Reactance Corp.
Myrtle Beach
Radio, television, electronic communication parts.

Elliott Metal Works
Greenville
Textile metal parts.

John Evans Mfg. Co., Inc.
Sumter
Trailers, truck bodies, logging equipment.

General Arts, Inc.
Columbia
Venetian blinds.

Greenville Steel & Foundry Co.
Greenville
Fabricated structural steel, textile machinery.

S. L. Huffman
Greenville
Plate metal.

Hunt Loom & Machine Works, Inc.
Greenville
Textile machinery.

Industrial Equipment Co.
Sumter
Machinery, machinery parts.

Kirkman & Dixon Machine Shop & Foundry
Greenwood
Textile machinery, parts, miscellaneous castings.

Kline Iron & Metal Co.
Columbia
Steel fabricating.

J. Roy Martin & Co.
Anderson
Sheet metal, roofing.

Martin & Cooper Roofing Co., Inc.
Anderson
Metal work.

B. L. Montague Co.
Sumter
Steel fabrication.

Norris Bros.
Greenville
Shuttles, specialties.

Owen Steel Co., Inc.
Columbia
Steel fabricators.

J. C. Paddock Co.
Spartanburg
Hand trucks, quill cans, textile machinery parts.

Palmetto Iron & Machine Co.
Spartanburg
Textile machinery parts, castings.

R. O. Pickens
Spartanburg
Tin and sheet metal shop.

Piedmont Iron Works, Inc.
Spartanburg
Structural steel.

J. A. Piper Roofing Co.
Greenville
Sheet metal products, roofing.

Pittsburgh Metallurgical Co., Inc.
Charleston
Chrome silicide, ferrochrome, ferrosilicon.

Plowden Co., Inc.
Columbia
Fabricated steel.

South Carolina

Acme Loom Harness & Reed Co.
Greenville
Loom reeds.

Aldrich Machine Works
Greenwood
Textile machinery.

Amaker & Waites Roofing & Sheet Metal Works
Columbia
Sheet metal.

Anderson Machine & Foundry Co.
Anderson
Repair parts.

Andrews Co.
Spartanburg
Ball bearings, loom reeds.

Arrow Armatures
Spartanburg
Rewind, rebuild armatures.

Bahan Textile Machinery Co.
Paris
Textile machinery and parts.

Barnwell Mfg. Corp.
Barnwell
Slide fasteners.

Carolina Foundry & Machine Works
Spartanburg
Gray iron textile repair parts.

Charleston Chair Co.
Charleston
Chairs.

In 10 years the South may be producing half of the nation's chemicals . . .

Poinsett Lumber & Mfg. Co.
Anderson
Sewing machines.

V. D. Ramseur & Sons
Greenville
Roofing, sheet metal products.

Reco Tanks, Inc.
Cayce
Metal tanks.

Rock Hill Body Co.
Rock Hill
Commercial truck bodies.

Segalock Fasteners, Inc.
Sumter
Slide fasteners.

Southeastern Steel Co.
Charleston
Steel fabrication.

Southern Loom-Reed Mfg. Co., Inc.
Gaffney
Textile machinery parts.

Steel Heddle Mfg. Co.
Greenville
Shuttles, reeds, loom harness sundries.

Sumter Machinery Co., Inc.
Sumter
Sawmill machinery, iron castings.

Sunray Co.
Camp Croft
Textile material handling equipment.

Textile Shops
Spartanburg
Textile machinery.

U. S. Bobbin & Shuttle Co.
Greenville
Textile bobbins.

J. C. Ware Roofing & Sheet Metal Works
Gaffney
Sheet metal work.

Bell Engineering Co.
2020 Chapman Hwy., Knoxville
Precision instruments.

Berg-Warner Corp., Norge Div.
Mfrs. Rd., Chattanooga
Refrigerator compressors.

John Bouchard & Sons Co.
1024 Harrison St., Nashville
Aluminum, bronze, copper and gray iron castings.

Broadway Metal & Roofing Co.
319 Broadway, N.W., Knoxville
Sheet metal fabrication.

Brock & Blevins Co., Inc.
411 W. Gordon Ave., Chattanooga
Fabricated steel products.

Brooks Equipment & Mfg. Co.
2018 Davenport Rd., S.E., Knoxville
Brooks load lugger, materials handling equipment.

Brown Stove Works, Inc.
Carolina Ave., Cleveland
Stoves, gas ranges, water heaters.

Callahan Industries, Inc.
892 Kansas St., Memphis
Special design machinery, fabricating.

Carloss Well Supply Co.
111 Concord, Memphis
Water swivels, drilling machines, pipe elevators.

Ceill-Heat
5212 Homberg Rd., Knoxville
Electric radiant heating systems.

Chattanooga Armature Works
1215 Duncan Ave., Chattanooga
Rebuilt electric motors.

Chattanooga Blow Pipe & Roofing Co.
1300 McCallie, Chattanooga
Sheet metal fabrication.

Chattanooga Boiler & Tank Co.
1011 E. Main, Chattanooga
Steel plate fabrication.

Chattanooga Implement & Mfg. Co.
1st & Delmar Sts., Chattanooga
Gas heaters, fireplace fixtures, barbecue grills.

Chattanooga Welding & Machine Co., Inc.
1309 Chestnut St., Chattanooga
Baling presses, tying attachments for hay balers.

Chattanooga Wheelbarrow Co.
1311 E. Main St., Chattanooga
Wheelbarrows, warehouse trucks, scrapers, carts.

Clarksville Foundry & Machine Works, Inc.
Commerce & Spring Sts., Clarksville
Gray iron castings, machine parts.

Cleveland Foundry & Mfg. Co., Inc.
685 Sixth St., N.E., Cleveland
Farm equipment, commercial castings.

Cline & Bernheim
810 17th Ave., N., Nashville
Processed scrap iron and metals.

K. F. Cline Co., Inc.
5200 Centennial Blvd., Nashville
Metal shelving, lockers.

Cobbie Bros. Machinery Co., Inc.
315 W. Main St., Chattanooga
Textile machinery.

Combustion Engineering-Superheater, Inc.
1032 W. Main St., Chattanooga
Boilers, pressure vessels, superheaters.

Conley Frog & Switch Co.
362 Bodley Ave., Memphis
Railroad track material and forgings.

Continental Piston Ring Co.
276 Walnut St., Memphis
Piston rings.

Converse Bridge & Steel Co.
2408 Vance Ave., Chattanooga
Structural steel fabrication.

Cookeville Sheet Metal & Supply Co.
Cookeville
Sheet metal fabrication.

Cooper & Winters
212 Woodland St., Nashville
Sheet metal fabrication.

Cordova Machine & Foundry Co., Inc.
Cordova
Metal fabrication, iron and aluminum castings.

Corley Mfg. Co.
Clifton Hills, Chattanooga
Sawmill machinery, saws, saw teeth.

Crane Co., Chattanooga Div.
33rd St. & Alton Park Blvd., Chattanooga
Cast iron enamelware, boilers, radiators.

Custom Products, Inc.
701 Foster St., Nashville
Aircraft parts, metal stampings.

Dixie Foundry Co., Inc.
King Edward Ave., Cleveland
Gas ranges.

Dorth Stove Works
Franklin
Ranges and heaters.

East Tennessee Sheet Metal Works, Inc.
620 Broad St., Bristol
Sheet metal products.

Economy Coach Co.
2087 York Ave., Memphis
Ambulances, funeral cars and service cars.

Electro Manganese Corp.
1323 Proctor St., N.W., Knoxville
Electrolytic manganese metal.

Wm. C. Ellis & Sons Iron Works
245 S. Front St., Memphis
Machine shop and foundry.

Englert Engineering Co.
805 6th Ave., N., Nashville
Structural steel fabrication.

Eureka Foundry Co.
Grove St. & Belt Rwy., Chattanooga
Aluminum, brass and gray iron castings.

Excel Smelting Corp.
1300 N. Seventh St., Memphis
Secondary aluminum ingot.

Feldkircher Wire Fabricating Co.
3255 Richardson Ave., Nashville
Wire products.

Flint Steel Corp.
Box 3155, Memphis
Pressure tanks.

Ford Motor Co.
1429 Riverside Blvd., Memphis
Automobiles.

Fruehauf-Carter Trailer Co.
1132 Kansas St., Memphis
Truck trailers.

Glazer Steel Corp.
2100 Ailor Ave., Knoxville
Steel fabrication.

Gray & Dudley Co.
2300 Clifton Rd., Nashville
Stoves and ranges.

Halliburton & Lane
121 5th Ave., S., Nashville
Commercial truck bodies.

Harriman Mfg. Co.
554 W. Main St., Chattanooga
Agricultural implements.

M. M. Hedges Mfg. Co., Inc.
700 E. Main St., Chattanooga
Automatic storage hot water heaters.

Herron Stove & Foundry Co., Inc.
811 W. 6th St., Chattanooga
Gas heaters, laundry stoves, gray iron castings.

Alfred Hoffman Co., Inc.
Sky Harbor Airport, Murfreesboro
Airplane parts.

Ernest Holmes Co., Inc.
2505 E. 43rd St., Chattanooga
Automotive wrecking and towing equipment.

Hunt Heater Corp.
Dayton
Gas-fired heating equipment.

Hunter Fan & Ventilating Co.
400 S. Front St., Memphis
Electric fans.

Tennessee

Accurate Machine Products Corp.
111 McClure St., Johnson City
Special machinery components.

Allen Mfg. Co.
300 10th Ave., N., Nashville
Cooking and heating stoves.

Aluminum Co. of America
Alcoa
Semifabricated aluminum, foil and paste.

America & Southern Corp.
1000 6th Ave., S., Nashville
Water heaters, ranges.

American Brake Shoe Co.
1814 Grove St., Chattanooga
Cast iron brake shoes.

American Mfg. Co.
124 Chestnut St., Chattanooga
Steel and wire products.

American Metal Products Co.
Union City
Automobile parts.

Armo Drainage & Metal Products, Inc.
339 W. Olive Ave., Memphis
Steel culverts and septic tanks.

Arwood Can Mfg. Co.
909 Cooper St., Knoxville
Tin cans, sheet metal work.

Athens Plow Co.
Athens
Tractor drawn agricultural implements.

Avco Mfg. Corp., Cresley Div.
Berry Field, Nashville
Aircraft subassemblies, appliances, farm implements.

The South is the nation's third fastest growing automotive market . . .

Material Controll Mfg. Co.

Bellico
Bronze bearings, castings, air compressors.

International Harvester Co., Memphis Works
Banetown Rd., Memphis
Farm implements.

Inter-State Foundry & Machine Co.
Pawer 990, Johnson City
Castings, special machinery, fabricated products.

Jones Foundry Co.
2800 Charlotte Ave., Nashville
Industrial hand trucks, gray iron castings.

Johnson City Foundry & Machine Works, Inc.
920 W. Walnut St., Johnson City
Gray iron castings, structural steel fabrication.

Lord E. Jones Co.
Mrs. Rd., Chattanooga
Steel fabrication.

S. Jones Co.
710 W. Walnut St., Johnson City
Specialty machine shop.

Muller Foundry Co.
1010 Jackson Ave., Knoxville
Gray iron and ni-hard castings.

Kennedy & Bowden Machine Co.
134 3rd Ave., N., Nashville
Precision parts, tools, dies.

Kerrigan Iron Works, Inc.
1033 Herman St., Nashville
Street light standards, pole line hardware.

Kingsport Foundry & Mfg. Corp.
Box 709, Kingsport
Gray iron castings, special machinery.

Knox Stove Works, Inc.
2016 Ailer Ave., Knoxville
Domestic cooking and heating stoves.

Knoxville Iron Co.
1943 W. Tennessee Ave., Knoxville
Hot-rolled carbon and alloy steels.

Layne & Bowler, Inc.
Box 6815 Hollywood Sta., Memphis
Turbine pumps, well screens and welded pipes.

Lenoir Car Works
Lenoir City
Brass, steel and gray iron castings.

Lewisburg Casting Co.
Lewisburg
Gray iron castings.

Lodge Mfg. Co.
South Pittsburg
Cast iron utensils, gray iron castings.

Lookout Boiler & Mfg. Co.
Mrs. Rd., Chattanooga
Boilers.

Lucy Boiler & Mfg. Corp.
1514 Chestnut St., Chattanooga
Power boilers.

McCann Steel Co.
400 S. 2nd St., Nashville
Structural steel fabrication.

John W. McDougall Co., Inc.
41st & Indiana Aves., Nashville
Light gage sheet metal products.

Major Casket Co.
1 Vance Ave., Memphis
Steel caskets.

Joe J. Malone Co.
223 Poplar Ave., Memphis
General sheet metal work.

Matthews Blow Pipe Co., Inc.
125 Keel Ave., Memphis
Dust control and blow pipe systems.

Memphis Casting Works, Inc.
1006 Oakland Ave., Memphis
Gray iron castings.

Memphis Machine Works
171 Vance St., Memphis
Saw mills and machinery.

Memphis Metal Mfg. Co., Inc.
795 Tanglewood St., Memphis
Fan housings, mechanical exercising horses.

Memphis Sheet Metal Works
233 S. Second St., Memphis
Sheet metal products.

Metalcraft Mfg. Corp.
643 Union Ave., Memphis
Step-on cans, portable ice chests.

Moccasin Bushing Co.
2000 Chestnut St., Chattanooga
Brass and bronze bearings and castings.

Mueller Co., Columbian Iron Works Div.
2501 Chestnut St., Chattanooga
Cast iron gate valves, fire hydrants, sluice gates.

Myers-Whaley Co., Inc.
Box 789, Knoxville
Underground mobile loading machines.

Nashville Bridge Co.
Nashville
Boats, barges, bridges, steel structures.

Nashville Casting Co., Inc.
808 10th Ave., N., Nashville
Gray iron castings.

Nashville Machine & Supply Co.
123 3rd Ave., N., Nashville
Machine shop.

National Mfg. Co., Inc.
1203 Terminal St., Memphis
Aluminum tubular display racks.

National Pressed Steel Roofing Co.
28 W. Virginia Ave., Memphis
Steel roofing, siding, gutters, hog feeders.

Newberry Equipment Co., Inc.
683 Linden Ave., Memphis
Steel tanks, truck tanks.

Olin Industries, Inc.
Covington
Flashlight batteries.

Paris Mfg. Co.
Paris
Auto parts.

M. B. Parker Co.
1449 Thomas St., Memphis
Farm equipment, fans, castings.

H. E. Parmer Co.
801 5th Ave., N., Nashville
Sheet metal fabrication.

Phillips & Buttorff Mfg. Co.
217 3rd Ave., N., Nashville
Stoves, ranges, heaters.

Pidgeon-Thomas Iron Co.
Main St. at Crump Blvd., Memphis
Structural steel, overhead cranes.

Post & Co., Inc.
408 S. Central Ave., Knoxville
Truck bodies.

Powermatic Machine Co.
McMinnville
Woodworking machinery.

Precision Tool Co., Inc.
166 Neil St., Memphis
Machine tools, fixtures, models.

C. H. Reese & Sons, Inc.
1309 Church St., Nashville
Sheet metal products.

Ross-Meehan Foundries
1601 Carter St., Chattanooga
Steel, Meehanite metal, alloy castings.

Rotary Lift Co.
1054 Kansas St., Memphis
Hydraulic elevators and lifts.

Samuel Stamping & Enamel Co.
Mrs. Rd., Chattanooga
Vitreous enameled parts, gas heating appliances.

W. J. Savage Co., Inc.
Clinch Ave. & Tenth St., Knoxville
Mill and mine machinery and equipment.

Sherman & Reilly, Inc.
1st & Broad Sts., Chattanooga
Wire rope tackle blocks, forgings.

Somerville Iron Works
Mrs. Rd., Chattanooga
Cast iron soil pipe and fittings.

Southern Blow Pipe & Roofing Co.
109 N. Highland Park Ave., Chattanooga
Sheet metal work.

Southern Boiler & Tank Works, Inc.
1199 Thomas St., Memphis
Steel plate fabricated products.

Southern Electrical Corp.
Mrs. Rd., Chattanooga
Copper and aluminum wire, steel guy strand.

Southern Electro-Plating Co.
263 Madison Ave., Memphis
Electroplating.

Southern Skein & Foundry Co.
2915 8th Ave., Chattanooga
Gray iron castings, anvils.

Southern Tin Compress Corp.
1270 N. Seventh St., Memphis
Processing reclaimed tin and steel.

Sperry-Farragut Corp.
Bristol
Guided missiles.

Stainless Metal Products, Inc.
2150 Chestnut St., Chattanooga
Wire products.

Standard Brake Shoe & Foundry Co.
138 E. Bodley Ave., Memphis
Railroad brake shoes.

Taylor Implement Mfg. Co.
Athens
Tractor drawn farm implements.

Temco, Inc.
4104 Park Ave., Nashville
Gas heaters, furnaces and clothes driers.

Tennessee Armature & Electric Co.
314 W. Jackson Ave., Knoxville
Rebuilt electric motors.

Tennessee Fabricating Co.
1490 Grimes St., Memphis
Ornamental iron products.

Tennessee Foundry & Machine Co.
806 16th Ave., N., Nashville
Gray iron castings.

Tennessee Products & Chemical Corp.
500 American National Bank Bldg., Nashville
Ferrolloys, pig iron, coke.

Tennessee Products & Chemical Corp.
Rockwood
Pig iron.

Tennessee Products & Chemical Corp.
Wrigley
Pig iron.

Tennessee Products & Chemical Corp., Southern Ferro
Alloys Div.
2108 Chestnut St., Chattanooga
Ferrosilicon, ferromanganese.

Tennessee Stove Works
E. 14th St. & Belt Ry., Chattanooga
Cooking and heating stoves.

Tennessee Valley Associates, Inc.
117 9th Ave., N., Nashville
Water heaters, fans, electric churns.

Tennison Bros., Inc.
450 N. Bellevue Blvd., Memphis
Sheet steel building products, corrugated metal pipe.

Tri-State Iron Works
677 N. Main St., Memphis
Structural steel.

Tucker Steel Corp.
P. O. Box 5225, Knoxville
Structural steel fabrication.

Ty-Sa-Man Machine Co.
1000 White Ave., Knoxville
Stone working machinery.

U. S. Pipe & Foundry Co.
27th & Chestnut Sts.
Cast iron pressure pipe and fittings.

U. S. Stove Co.
South Pittsburg
Heaters and ranges.

Vestal Stove Co.
Sweetwater
Stoves, metal products.

Walters Mfg. Co.
934 E. Main St., Morristown
Conveyors for woodworking industry, machine shop.

Wheland Co.
2727 S. Broad St., Chattanooga
Automotive castings, heavy machinery.

John Williams Steel Works
315 Lake St., Jackson
Fabricated structural steel, agricultural implements.

Fred D. Wright Co., Inc.
316 Howerton St., Nashville
Tools and dies, metal fabrication.

Ziegler Foundry, Inc.
1428 E. 28th St., Chattanooga
Soil pipe and fittings, gray iron castings.

Turn to Page 228

Since 1929, manufacturing income of the South has shown a 500 pct rise . .

Ask Mr. South—

If You Want More Details

SOUTHERN STATES have excellent facilities to furnish specific data on plants, taxes, raw materials, labor supply and laws affecting industry.

The states cooperate with state chambers of commerce which have close ties with city and town groups. Listed below are state departments or chambers to contact for more detailed information.

ALABAMA

Alabama State Chamber
of Commerce
225 Dexter Ave.
Montgomery 1, Ala.

LOUISIANA

State Department of
Commerce & Industry
State Capitol
Baton Rouge, La.

SOUTH CAROLINA

South Carolina Research,
Planning & Development Board
Columbia, S. C.

FLORIDA

Florida State Chamber
of Commerce
510-520 Hildebrandt Bldg.
Jacksonville 2, Fla.

Florida State
Improvement Commission
Tallahassee, Fla.

MISSISSIPPI

Mississippi Agricultural &
Industrial Board
State Office Bldg.
Jackson, Miss.

TENNESSEE

Tennessee State
Planning Commission
517 Commerce St.
Nashville 3, Tenn.

GEORGIA

Georgia Department
of Commerce
100 State Capitol
Atlanta 3, Ga.

NORTH CAROLINA

North Carolina Department
of Labor
Raleigh, N. C.

VIRGINIA

Virginia State Chamber
of Commerce
111 N. Fifth St.
Richmond 19, Va.

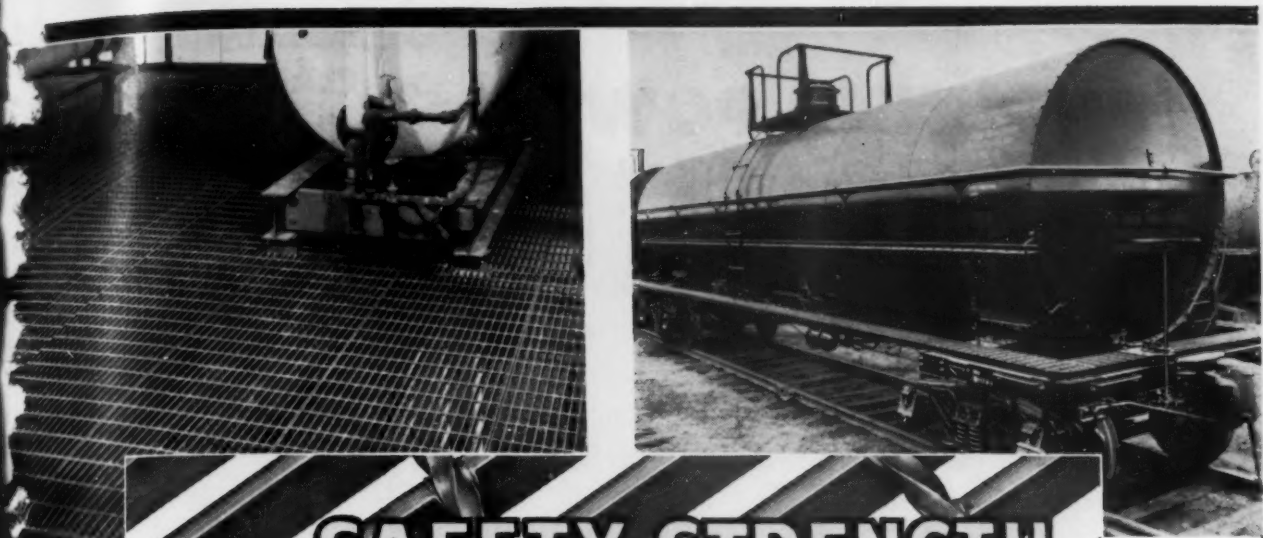
KENTUCKY

Agricultural & Industrial
Development Board
415 Ann St.
Frankfort, Ky.

Kentucky Chamber
of Commerce
317 Fincastle Bldg.
Louisville, Ky.

ACKNOWLEDGMENTS

Among the groups and firms cooperating with the editor on this study were:
U. S. Dept. of Commerce, Westinghouse Electric Corp., General Electric Corp.,
Worthington Corp., U. S. Steel Corp., Jones & Laughlin Steel Corp., American
Telephone & Telegraph Co., Southern Bell Telephone & Telegraph Co., Alabama
Power Co., Southern Assn. of Science & Industry, Reynolds Metals Co., Federal
Power Commission, Edison Electric Institute, National City Bank of New York,
Gulf, Mobile & Ohio R.R., United Steelworkers of America, American Federation
of Labor, Railway Car Institute, Atlantic Steel Co.



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and **VENTILATION**
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KERRIGAN
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Approved by the
Association of
American Railroads.
Conforms to Federal
specification
RR-G-661A and
amendments, and
MIL-G-1958 and
amendments.



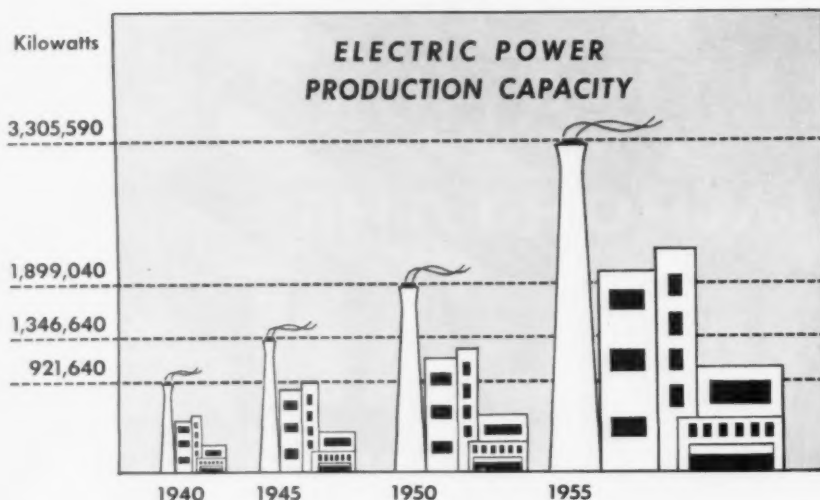
KERRIGAN IRON WORKS, Inc.

Nashville, Tennessee

GENERAL SALES OFFICE: 274 MADISON AVENUE, NEW YORK CITY

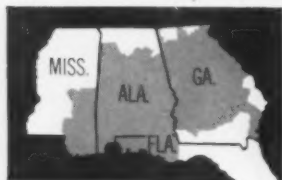
GROWING POWER FOR SOUTHERN CITY, U.S.A.

One of several important reasons for the rapid industrial and agricultural expansion of Southern City has been an ample supply of electric "growing power." By always planning and building ahead the operating companies of The Southern Company system provide today for tomorrow's needs.



Electric power production capacity for industrial, agricultural and home use in 1955 is scheduled for 3,305,590 kilowatts, which is more than three and one third times the 1940 capacity. The Southern Company system will continue to plan and build ahead of Southern City's continually increasing requirements.

SOUTHERN CITY, U.S.A.



This is Southern City, U.S.A.

our way of expressing as a unit the vast Southeast area served by the four associated electric power companies in The Southern Company System.

Write, wire or telephone any of the operating companies below for information.

ALABAMA POWER COMPANY,
Birmingham, Alabama

GEORGIA POWER COMPANY,
Atlanta, Georgia

GULF POWER COMPANY,
Pensacola, Florida

MISSISSIPPI POWER COMPANY,
Gulfport, Mississippi

★ ★ ★
THE SOUTHERN COMPANY,
Birmingham • Atlanta

METALWORKING PLANT DIRECTORY

(Continued from Page 225)

**Who are they?
What do they make?**

Virginia

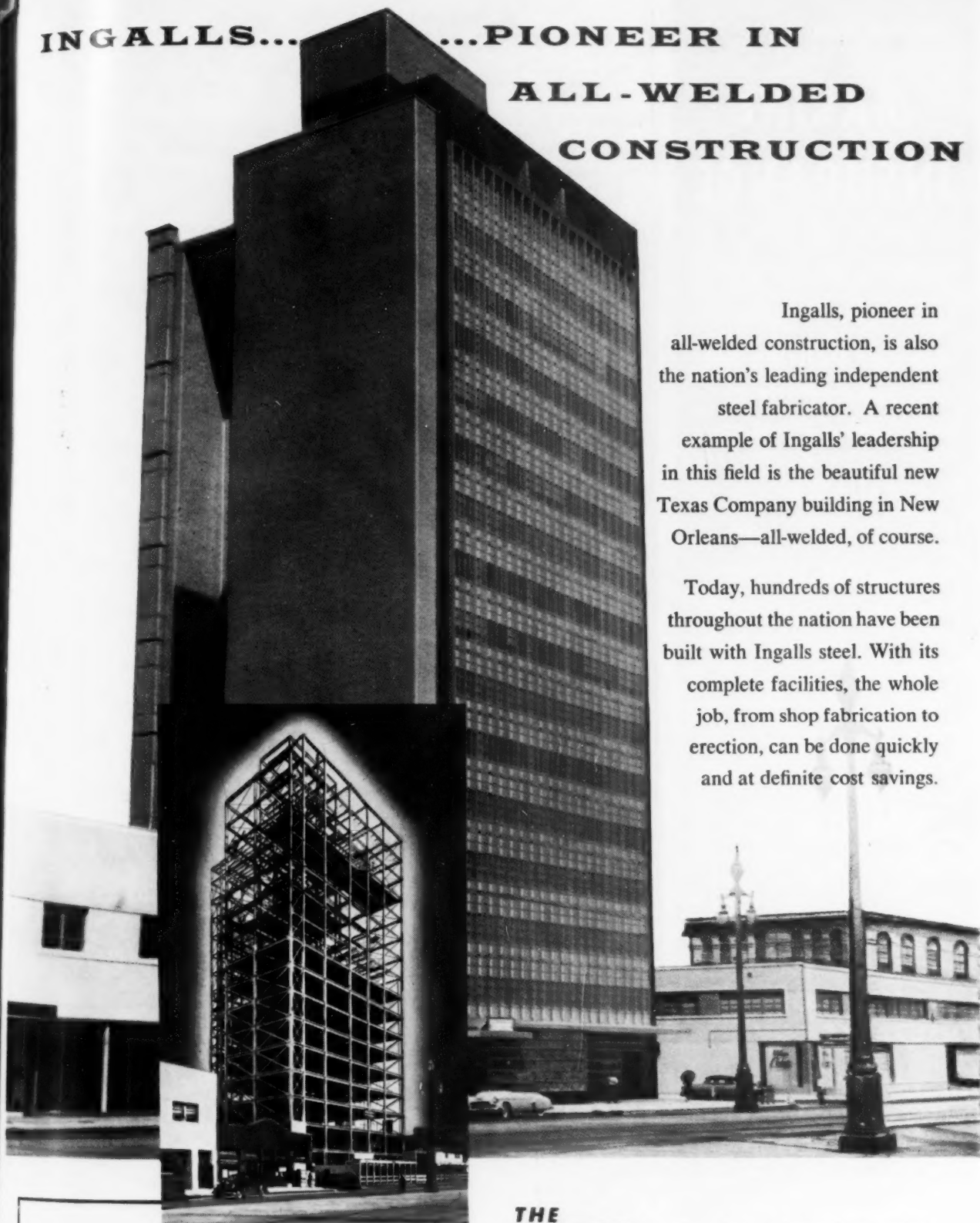
- Acme Visible Records, Inc.
Crozet
Metal filing cabinets.
- Alexandria Iron Works, Inc.
Box 214, Alexandria
Fabricated structural steel, gray iron castings.
- Allied Chemical & Dye Corp., General Chemical Div.
Galax
Metal ores.
- American Brake Shoe Co., National Bearing Div.
Box 348, Portsmouth
Nonferrous castings.
- American Machine Development Corp.
205 W. Grace St., Richmond
Baking equipment.
- American Truck & Body Co., Inc.
Martinsville
Truck and bus bodies, truck trailers.
- Associated Naval Architects, Inc.
West Norfolk
Shipbuilding.
- Atlas Machine & Iron Works, Inc.
1252 Jefferson Davis Highway, Arlington
Fabricated structural steel.
- Baker Equipment Engineering Co., Inc.
1700 Summit Ave., Richmond
Truck and bus bodies, truck trailers.
- Barnum-Bruns Iron Works
632 W. 24th St., Norfolk
Fabricated structural steel.
- Bemiss Equipment Corp.
2219 Chamberlayne Ave., Richmond
Diesel generators.
- Benthall Machine Co., Inc.
Box 513, Suffolk
Peanut pickers, hay balers.
- Bingham & Taylor Corp.
Culpeper
Gray iron castings.
- Black Diamond Trailer Co., Inc.
Bristol
Truck and bus bodies, truck trailers.
- Bonsack Machine Co., Inc.
Box 528, Lynchburg
Tobacco machinery.
- Brenco, Inc.
Box 548, Petersburg
Railroad car journal bearings.
- Bristol Steel & Iron Works, Inc.
Bristol
Fabricated structural steel, tanks.
- Brown & Grist
Box 265, Newport News
Aluminum awning windows.
- Capital City Iron Works
3010 Peebles St., Richmond
Fabricated structural steel, tanks, stacks.
- Cardwell Machine Co.
Box 1359, Richmond
Peanut shellers, bailing presses, tobacco machinery.
- Colonna's Shipyard, Inc.
Box 4597, Norfolk
Shipbuilding.
- Comas Machine Co., Inc.
526 College Ave., Salem
Tobacco machinery.

Turn Page

INGALLS... ..PIONEER IN ALL-WELDED CONSTRUCTION

Ingalls, pioneer in all-welded construction, is also the nation's leading independent steel fabricator. A recent example of Ingalls' leadership in this field is the beautiful new Texas Company building in New Orleans—all-welded, of course.

Today, hundreds of structures throughout the nation have been built with Ingalls steel. With its complete facilities, the whole job, from shop fabrication to erection, can be done quickly and at definite cost savings.



FABRICATED STEEL FOR:

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Stacks • Pressure Vessels • Industrial Plants • Office
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Sales Offices: New York, Chicago, Pittsburgh, Houston
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Pascagoula, Miss., Decatur, Ala.

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INSURANCE COMPANY
and
STANDARD FIRE
INSURANCE COMPANY
OF HARTFORD, CONNECTICUT

Affiliated with
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Agents Everywhere

Plant Directory

Continued

Craig Bros. Marine Ry., Inc.
412 Rose Ave., Norfolk
Shipbuilding.

Crawford Mfg. Co., Inc.
Box 1496, Richmond
Metal awnings.

Cruickshanks Iron Works Co.
Dineen St. & S.A.L.R.R., Richmond
Fabricated structural steel.

Dabney Foundry & Machine Works, Inc.
1300-1308 Commerce St., Lynchburg
Gray iron castings.

Dominion Manganese Corp.
Crimora
Ferroalloys.

Dunn's Marine Ry., Inc.
West Norfolk
Shipbuilding.

Electrical Equipment Co.
Box 1714, Richmond
Electrical equipment.

Electro Metallurgical Co.
Holcomb Rock
Ferrochrome.

Emporia Machine Co., Inc.
Box 979, Emporia
Gray iron castings, plows.

Enterprise Wheel & Car Corp.
Box 151, Bristol
Gray iron castings.

Al Evans Winches, Inc.
Gloucester
Winches, steel cable fittings.

Ferguson Mfg. Co., Inc.
Box 5, Suffolk
Farm implements.

Ford Motor Co.
Box 780, Norfolk
Assembling.

Gary Steel Products Corp.
Box 1810, Norfolk
Tanks.

Georator Corp.
1820 N. Nash St., Arlington
Electric generators, prospecting instruments.

Glamorgan Pipe & Foundry Co.
Drawer 740, Lynchburg
Gray iron castings.

Globe Iron Construction Co.
Princess Anne Road & Park Ave., Norfolk
Fabricated structural steel.

Gould-National Batteries, Inc.
Box 2059, Lynchburg
Primary batteries.

Graham-White Mfg. Co.
Box 512, Salem
Locomotive accessories.

Hall-Hodges Co., Inc.
Box 7055, Lafayette Station, Norfolk
Wire mesh, fabricated structural steel.

John W. Hancock, Jr., Inc.
Box 1258, Roanoke
Steel bar joists.

Hankins & Johann, Inc.
Box 7147, Richmond
Aluminum doors, screens, windows.

Hastings Instrument Co., Inc.
Superhighway at Pine Ave., Hampton
Industrial controls.

Hooper Body Corp.
Box 56, Newport News
Truck and bus bodies, truck trailers.

Horne Bros., Inc.
Box 21, Newport News
Shipbuilding.

Humphreys Railways, Inc.
Weems
Shipbuilding, fishing industry machinery.

Inta-Roto Machine Co., Inc.
R.F.D. No. 6, Box 45, Richmond
Film, foil and paper converting machines.

Johnson Forge & Steel Corp.
2400 Maury St., Richmond
Iron and steel forgings.

A. F. Jorss Iron Works, Inc.
300 10th St., Arlington
Fabricated structural steel.

E. J. Lavino & Co.
Box 592, Lynchburg
Ferromanganese.

Lincoln Industries, Inc.
Marion
Chrome dinettes.

Liphart Steel Co., Inc.
3308 Rosedale Road, Richmond
Fabricated structural steel.

Lynchburg Foundry Co.
Lynchburg
Gray iron castings.

Lynchburg Foundry Co.
Box 1012, Radford
Gray iron castings.

J. H. Mailander Co., Inc.
108 Franklin St., Alexandria
Pressure vessels.

Marbis Chapman Corp.
Box 151, Harrisonburg
Storage tanks.

A. Meyer Sons, Inc.
120 S. 8th St., Richmond
Truck and bus bodies, truck trailers.

Molins Machine Co., Inc.
1716 Summit Ave., Richmond
Cigarette, tobacco machinery.

Monroe Calculating Machine Co.
Box 191, Bristol
Adding, accounting machines.

Montague-Betts Co.
Box 2028, Lynchburg
Fabricated structural steel.

Multistamp Co.
527 W. 21st St., Norfolk
Stencil duplicators.

New Jersey Zinc Co., Bertha Mineral Div.
Austinville
Zinc.

Newport News Shipbuilding & Dry Dock Co.
4101 Washington Ave., Newport News
Gray iron castings.

Norfolk Shipbuilding & Dry Dock Corp.
Box 2100, Norfolk
Ship building.

Old Dominion Iron & Steel Corp.
Box 466, Richmond
Instantaneous heaters.

Oren Roanoke Corp.
Box 264, Roanoke
Fire apparatus.

Perrin & Martin, Inc.
Box 287, Arlington
Sheet metal work.

Refrigeration Engineering Corp.
Box 941, Emporia
Freezers, refrigerators, air conditioning units.

Reimers Electric Appliance Co., Inc.
Clearbrook
Steam generators.

Reynolds Metals Co.
3rd & Grace Sts., Richmond
Aluminum foil.

Richard Machine Works, Inc.
307 S. Main St., Norfolk
Vegetable washers, graders, conveyors.

Richmond Engineering Co., Inc.
7th & Hospital Sts., Richmond
Instantaneous heaters.

Richmond Foundry & Mfg. Co., Inc.
1300 Hermitage Road, Richmond
Gray iron castings.

Turn Page



LOOK SOUTH
LOOK AHEAD

Growing like Jack's Beanstalk!

FOR YEARS, the Southern Railway System and many other organizations and individuals in the Southland have been saying to all America—"Come South, to find spectacular new opportunities in industry, agriculture and commerce." And our voices have been heard!

In the past decade, the South's rate of economic growth has far exceeded the national average in new construction, now at an all-time high—in expanded manufacturing output—in farm income, which has quadrupled—in per capita income and consumer sales.

In the past 12-month period, 356 new industrial constructions or major additions have taken place along the Southern Railway System alone, representing an investment of \$544 million and giving employment to more than 22,000 workers.

We have come a long way. And ahead is the certainty of still greater progress and growth.

Harry A. W. Butts
President



SOUTHERN RAILWAY SYSTEM

WASHINGTON, D. C.

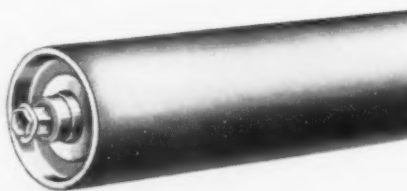


**SOMETHING
New**

X-Series
Bearing
Assembly

... in a BEARING for conveyor rolls

Write for folder, describing in detail, this important new Logan development for conveyor rolls. This is a low-friction, extra quiet bearing, known as X-Series. Semi-precision construction yet virtually the same price as ordinary conveyor roll bearings. Note: 33% less grade required on gravity lines. Write for details.



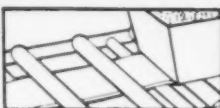
The most important bearing development for conveyor rolls in two decades.

DEVELOPED BY

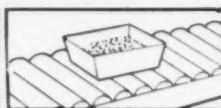
Logan



For Belt Conveyors



For Live Roll Conveyors



For Roller Conveyors

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Plant Directory

Continued

Richmond Structural Steel Co., Inc.
18th & Byrd Sts., Richmond
Fabricated structural steel.

Rife-Loth Corp.
Waynesboro
Gray iron castings.

Roanoke Iron & Bridge Works, Inc.
Box 1711, Roanoke
Fabricated structural steel.

Roanoke Iron Works, Inc.
509 3rd St., S.E., Roanoke
Fabricated structural steel.

Ross Iron Works, Inc.
809 Goshen St., Richmond
Fabricated structural steel.

Salem Foundry & Machine Works, Inc.
Salem
Milling machine attachments, gray iron castings.

Smith-Moore Body Co., Inc.
Brook Road at Lombardy St., Richmond
Truck and bus bodies, truck trailers.

Southern Iron Works, Inc.
2 Duke St., Alexandria
Fabricated structural steel.

Southern Materials Co., Inc.
Box 210, Norfolk
Ship building.

Southern Steel & Stove Co., Inc.
Box 477, Richmond
Coal and wood stoves, ranges and heaters.

Specialties, Inc.
858 W. Main St., Charlottesville
Computing, controlling, indicating instruments.

Standard Iron & Steel Co., Inc.
1836 Church St., Norfolk
Fabricated structural steel.

Strickland Machine Co.
2332 E. Main St., Richmond
Gray iron castings.

Temple Foundry, Inc.
Box 605, Alexandria
Gray iron castings.

Thomas Marine Corp.
127 Boush St., Norfolk
Ship building.

Tidewater Ship Repair Corp. of Virginia
15 Roanoke Ave., Norfolk
Ship building.

E. E. Titus, Inc.
215 N. South St., Petersburg
Gray iron castings.

Tobacco Machinery Corp.
Box 1498, Richmond
Tobacco machinery.

Tredegar Co.
Box 1398, Richmond
Projectiles, rockets, blast furnaces.

U. S. Electronics Corp.
800 Slaters Lane, Alexandria
Electronic equipment.

Virginia Metal Products Corp.
Orange
Doors, frames.

Virginia Steel Co., Inc.
3122 W. Cary St., Richmond
Fabricated structural steel.

Walker Machine & Foundry Corp.
Box 990, Roanoke
Gray iron castings.

West Engineering Co.
Box 6003, Richmond
Textile printing presses.

Westbrook Elevator Mfg. Co., Inc.
Danville
Elevators, escalators.

Whaley Engineering Corp.
Box 1336, Norfolk
Fabricated structural steel, rockets.

White Foundry Co., Inc.
Box 1292, Roanoke
Gray iron castings.

R. W. Whitehurst Mfg. Corp.
902 Cooke Ave., Norfolk
Plows, gray iron castings.

J. G. Wilson Corp.
Box 599, Norfolk
Doors.

Yale & Towne Mfg. Co.
1242 Colorado St., Salem
Locks.

Technical Briefs

Continued from Page 193

high accuracy of tooth spacing is important. A typical example is in the sharpening of cutters for production of metal saws. Specially adapted models can be used for the sharpening of tongue-and-groove and planing machine cutters in the woodworking industry.

The GW 30 has a maximum wheel slide stroke of about 20 in. It will grind a maximum length of 16 in., with a maximum depth of cut of $3\frac{3}{8}$ in. Maximum diameter of work is 12 in. On spiral flutes, lead range is from 15 to 750 in. Area of machine base is 60 x 24 in., and floor space required is 80 x 50 in.

TRANSPORTATION:

Dual purpose unit used by Navy on both rail and road.

Increased mobility for a small, powerful freight car switching unit was the idea behind design of the new Trackmobiles recently put into operation by the U. S. Navy. The tiny switchers, built by Whiting Corp., Harvey, Ill., are being used to spot or switch railroad cars.

The unit can travel on either its rubber-tired road wheels or its steel rail wheels. The machine weighs only 6000 lb but develops 7350 lb of draw-bar pull through its unique coupling arrangement.

A special coupler is jacked against the railroad car coupler to transfer part of the car's weight to the Trackmobile which gives the tractive effort needed to move the railroad cars.



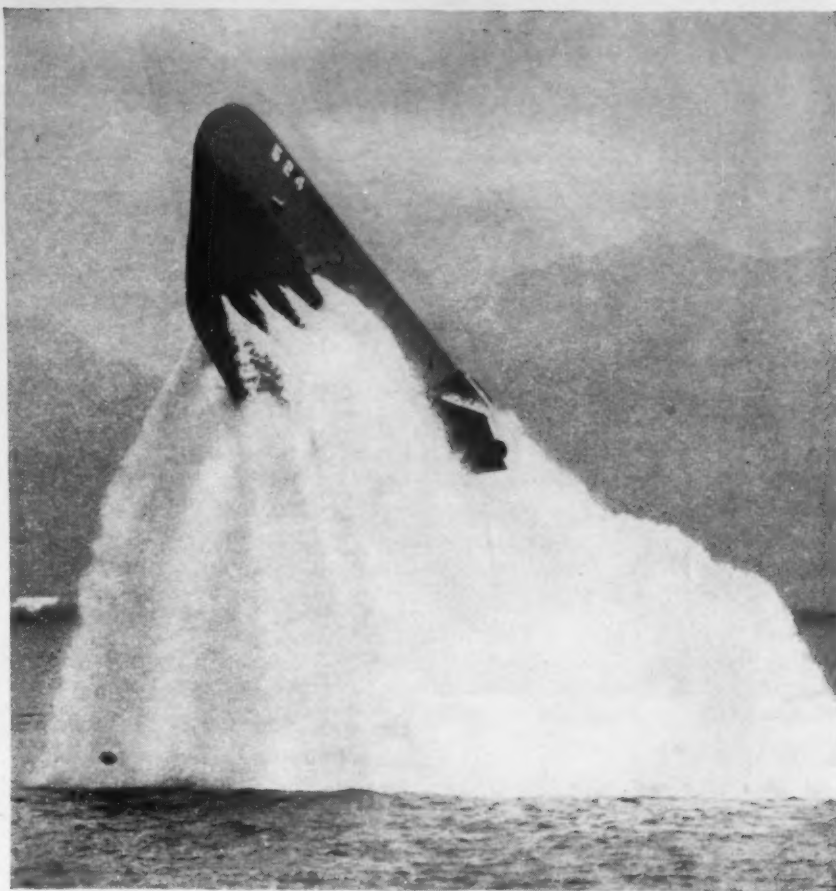
VERSATILE Whiting Trackmobile has just been delivered to the Navy for spotting and switching railroad cars.

Turn Page

ELECTRO DYNAMIC

extra

dependable



OFFICIAL U. S. NAVY PHOTO TAKEN OFF OAHU, HAWAII

UP FROM THE SEA comes fabulous Motor Stamina for Industry!

Over half a century of service aboard U.S. Navy submarines — where dependability means life itself — has bred tremendous stamina into ELECTRO DYNAMIC industrial motors. This inheritance of *extra dependability*, proved during years of gruelling duty under the sea, explains the amazing performance records being established by E.D. motors in industry today.

From 1 to 250 h.p.

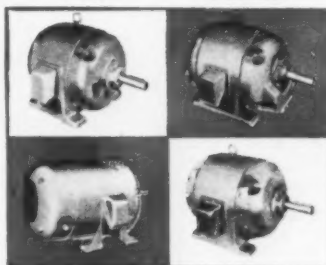
(N. E. M. A. STANDARDS)



WRITE TODAY FOR CATALOGUE NO. 1167A

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Extra large "free-flo" air channels.



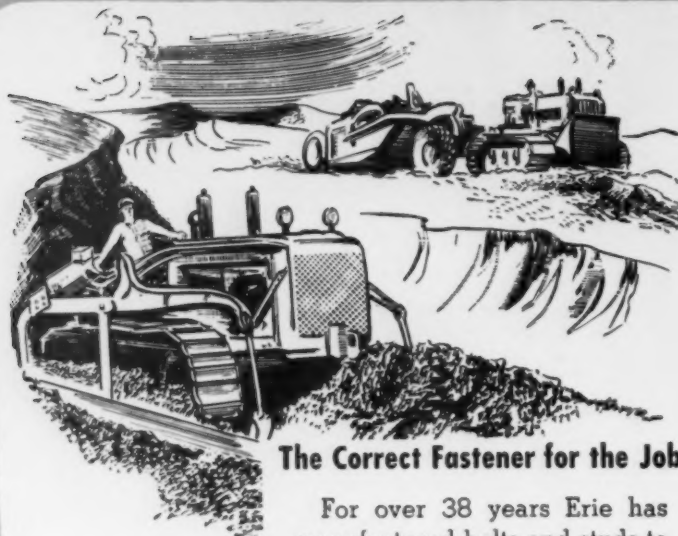
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DIVISION OF GENERAL DYNAMICS CORPORATION
BAYONNE, NEW JERSEY

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CARBON • BRONZE

Representatives in Principal Cities.

Technical Briefs

TURNING:

NMTBA study at Cornell seeks best form for tool cutters.

In cutting steel, the material tends to form a long spiral, known as a "snarling" chip, which gets tangled up and forms a mass which is hard to handle and clear out of the machine.

Grinding the top of the tool so as to bend the chip back on itself tends to break the chip so that it comes off the machine in small pieces, which can be readily removed without stopping the machine. If, however, the chip is broken too small, tool life is sharply reduced.

What Controls Chip Form?

This research project is the first attempt to determine for cuts in various grades of steel, what dimensions control the form of the chip, to suggest the best angles of rake and clearance, and to give the tool room a simple rule which will ensure optimum results both as to form of chip and tool life.

The report, printed in booklet form, is the result of a research project conducted during the last two years at the Sibley School of Mechanical Engineering of Cornell University, Ithaca, N. Y. Professor Erik K. Henriksen of the Department of Materials Processing and Director Harry J. Loberg of the College of Engineering guided the project.

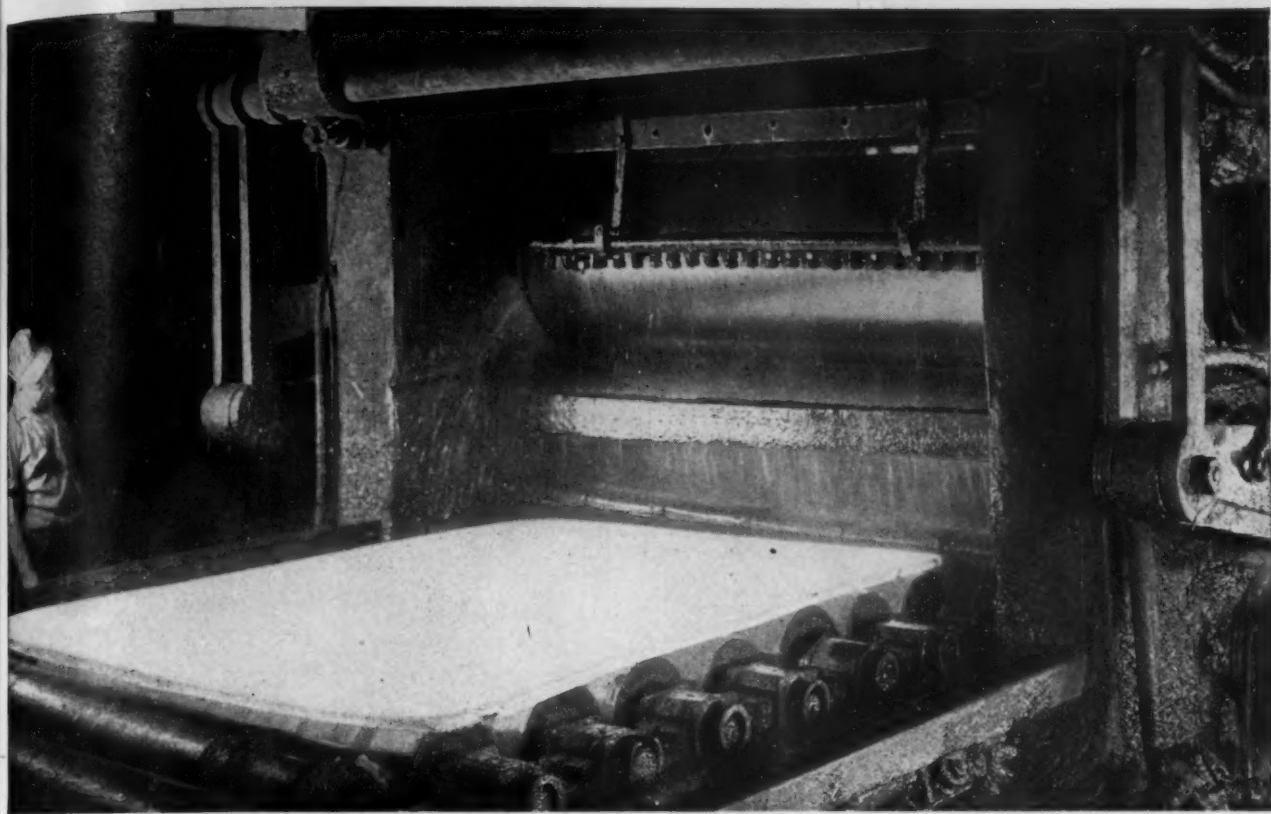
All Turning Operations

The findings are primarily applicable to turning operations. They apply equally well to engine lathes, automatic lathes, turret lathes, boring mills, automatic bar machines, and will be helpful on other cutting operations, such as planing, shaping, etc.

The research project was jointly undertaken by a number of machine tool companies (under the auspices of the National Machine Tool Builders' Assn).

In addition to the report itself the Steering Committee has prepared a wall chart that can be hung in the tool room in order to give the men who grind carbide

Turn Page



HOT PLATE SPECIAL rushing from an 89" rolling mill at Barium's Central Iron & Steel Company, Harrisburg, Pa.

Here comes next year's luxury liner

Or a giant oil storage tank or a freight car or a bridge for a super highway.

Wherever it goes, however, high-quality steel plate from Barium's 100-year-old Central Iron & Steel Company rates a warm welcome. And it goes nearly everywhere in basic industry—petroleum, transportation, shipping and construction.

Plate steel is only one of a long list of Barium steel products. In fact, few other steel companies make so many different things.

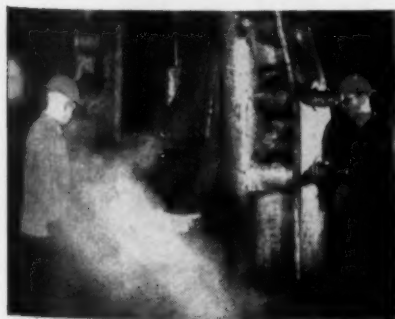
And when you deal with Barium, you draw on a 16-company reservoir of engineering knowledge and production experience hard to match even in much larger companies.

Maybe that's why so many essential products you see today—from tiny instrument springs to 20,000-barrel tanker barges—wear Barium nameplates. We'll be glad to tell you what's behind this name. Write Barium Steel Corporation, 25 Broad St., New York 4, New York.



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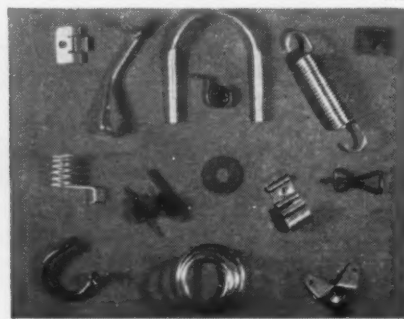
3.3



HAMMERING HOME its point is this drop forge at Barium's Globe Forge, Inc., Syracuse, N. Y. Globe forges a wide range of products, from automotive gear blanks to rocket components and tank parts, specializes in intricate customer-specified jobs.




BIG BOLTS are these 2 in. diameter steel heavyweights being forged on an Acme machine at Barium's Bayonne Bolt Corp., Bayonne, N. J. Bayonne makes standard and special fasteners from 1/4 in. to 4 in. in diameter.



GROUP PORTRAIT showing a few of the almost endless variety of extension, compression and torsion springs, wire forms and flat springs made by Barium's Cuyahoga Spring Co., Cleveland, O. At middle right is famous Snap-Clip.

THE SKY'S THE LIMIT IN SAVINGS WHEN YOU *Roto-Finish* PRECISION PARTS




Tedious, hand or semi-mechanical finishing of precision parts takes time . . . costs money. With the original Roto-Finish process, using Roto-Finish machines, chips and compounds, one man can finish hundreds of parts at one time . . . to exact tolerances. The illustrated parts show the diversity in size, shape and material in the parts that are now precision finished by the Roto-Finish process.

To determine your requirements Roto-Finish maintains a completely equipped laboratory which can (and does) process parts to your specifications. The results we obtain are guaranteed to be duplicated in your plant. This sample processing service is yours without obligation. Just send a few unfinished parts . . . along with a finished part as a guide, for prompt recommendation of the correct Roto-Finish process that exactly fits your requirements.

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—Technical Briefs—

tools, simple and clear directions on the optimum shape of the tool, including angles of rake and clearance and the dimensions of the chip-breaker.

Double Pieces Per Grind

In a preliminary test of these findings by a large Detroit company, the number of pieces produced per grind of the tool was in some cases doubled and in others more than doubled, in combination with a very satisfactory chip formation, which indicates the startling nature of the improvement that can be accomplished by following the formula derived from this research project.

Copies of the report and of the wall chart may be obtained from supporting companies who are members of NMTBA.

SCRAP:

Better handling methods assure higher price for plant scrap.

Improved handling methods for the sorting, weighing and disposal of scrap at McCulloch Motor Corp., Los Angeles, have simplified the problem of scrap segregation and helped gain better scrap prices for the company.

McCulloch installed a 92 ft long disposal dock and divided it into one ton capacity sheet-steel bins. Each bin holds a different type of scrap. Some are naturally much more valuable than others but would have much lower resale value if mixed with inferior grades.



SEGREGATED SCRAP in bin is weighed right at the disposal dock as the bin is lifted to truck bed height.

Turn Page

elling the story of 'dag' dispersions

Lubrication Troubles

Above 500°F?

Try This!



Use a 'dag' dispersion. At high temperatures it has conventional lubricating agents beat a mile. Why? Because at ordinary metalworking temperatures it doesn't burn off, flake, or gum up. It successfully battles oxidation at every temperature up to 750°F.

'dag' dispersions of graphite form microscopically thin, *dry lubricating films* which fight friction beyond the burning-points of most oils. These dry films are unaffected by heat up to 750°F. . . . under some conditions up to 3000°F.

For more details on metalworking applications write for Bulletin No. 426-13L.

* * *

Dispersions of molybdenum disulfide are available in various carriers. We are also equipped to do custom dispersing of solids in a wide variety of vehicles.



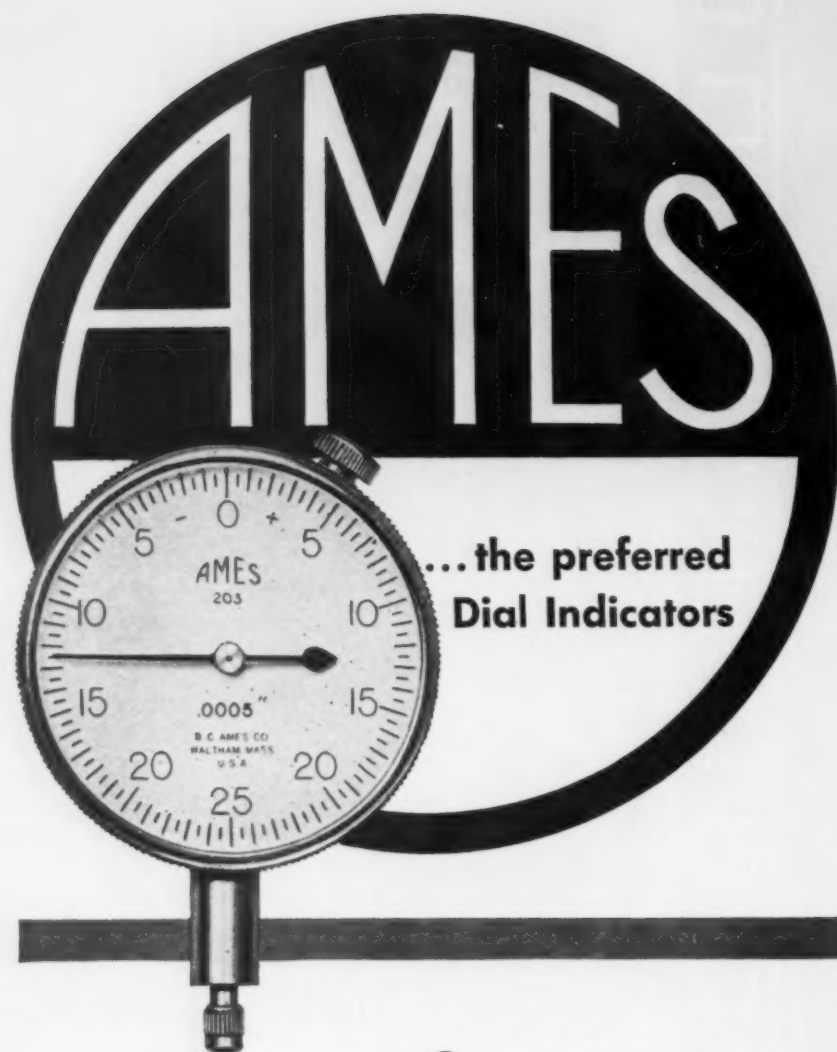
Acheson Colloids Company, Port Huron, Mich.

... also ACHESON COLLOIDS LIMITED, LONDON, ENGLAND

Units of Acheson Industries, Inc.



ry resin-bonded dry graphite films
for permanent lubrication



...the preferred
Dial Indicators

One of America's largest and most famous mass-producers recently chose Ames as preferred source of supply for indicator gauges.

The reasons behind this decision are the very reasons why *you* should standardize on Ames dial indicators and dial gauges: — the Ames "Hundred Series" indicators available in four sizes, fit every measuring requirement; they are *accurate, sensitive*, low in friction, yet are *rugged and tough* — give *more on-the-job* time. All Ames products embody latest design and highest-quality materials; they are manufactured by methods and machines that are *exclusive* with B. C. Ames Co.

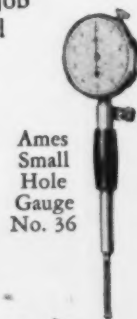


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Technical Briefs

Raise Bin to Truck Level

Every bin load of scrap is weighed by raising the bins to truck level with an overhead hoist. A Dillon Weight Indicator is placed between the hoist and the bin, tallying each "lift" quickly and accurately.

McCulloch expects to pay for this disposal dock and scale in less than two years with the money they are saving by segregating and weighing their scrap.

Has Rapid Reset

The indicator is an 0-5000 lb capacity model. It has a 16 in. diameter dial and is easy to read even from a distance. Provision is made for rapid reset on tare loads. Accuracy is guaranteed to one division at any point around the dial.

STRUCTURAL ASSEMBLY:

Impact wrench calibration important in structural assembly.

Calibration of pneumatic impact wrenches used for tightening high-strength bolts used in assembly of structurals has been simplified with a procedure developed by Bethlehem Pacific Coast Steel Corp. The method was recently demonstrated at the 22nd annual convention of the Structural Engineers Assn. of California.

Since all high-strength bolts are required to be torqued to at least 90 pct of their elastic proof load, impact wrenches must be



ADJUSTING AIR PRESSURE to give correct tension, this pneumatic impact wrench will stall when the high-strength bolt has been properly torqued.

Turn to Page 257

Technical Briefs

calibrated to produce the proper tension on the bolt within a 10-15 second period. The wrench is calibrated to stall when the bolt has been torqued to a predetermined tension value.

Air Pressure Adjusted

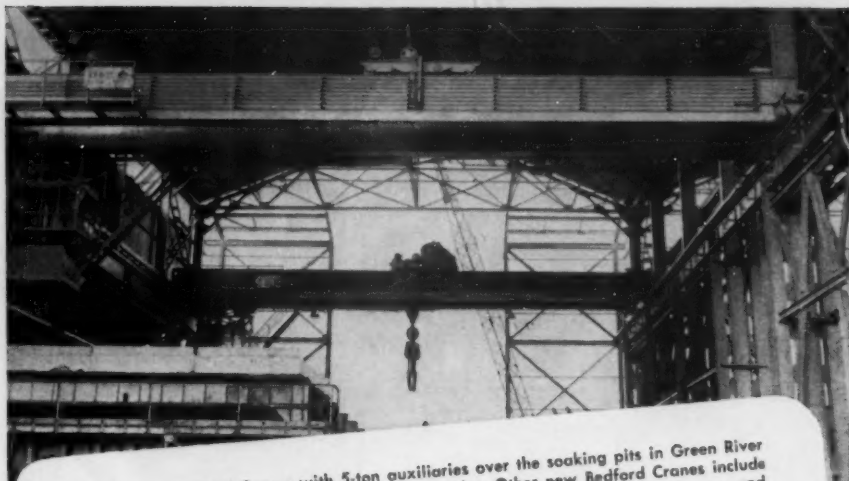
This calibrating procedure, developed by Bethlehem Pacific, is now being used for the first time in this area. Air pressure is adjusted to give the correct tension for the particular size high-strength bolt used.

The gage at the hydraulic jack shows pounds per square inch of tension applied on the bolt by the impact wrench. During the demonstration, 50-lb of air pressure was used to tighten a 3/4-in. diameter high-strength bolt to a tension of 28,000 psi.

Use on Ford Plant

Equipment of this type will be used on each Bethlehem Pacific structural steel erection job for which the company's high-strength bolting has been specified. It is now being used on the new Ford Motor Co. assembly plant, at Milpitas, Calif.

Bethlehem Pacific is fabricating and erecting more than 7400 tons of structural steel for this plant and 50 tons of the Company's high-strength bolts will be used.



Two 10-ton Bedford Cranes with 5-ton auxiliaries over the soaking pits in Green River Steel Company's new mill at Owensboro, Kentucky. Other new Bedford Cranes include one 75-ton ladle crane, one 25-ton charging crane, one 10-ton scrap yard crane, and two 10-ton utility cranes.

Seven New Bedfords at Green River Steel

More and more steel men are comparing—and choosing Bedford Cranes for advanced design—for precision engineering—for safe, smooth, dependable performance.

Backed by more than 50 years of specialized crane

building experience—each Bedford Crane is custom engineered for its specific application.

Available in all types and sizes from 5 tons to 350 tons—and up!

Write for complete catalog.

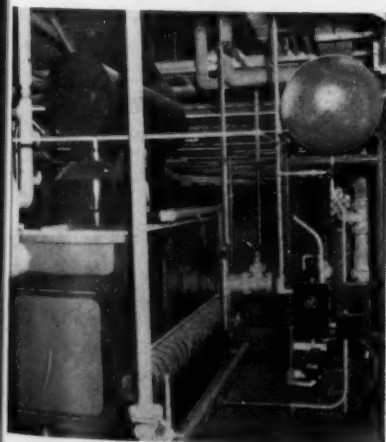


Foreground: 25-ton Bedford charging crane with 5-ton auxiliary.
Background: 10-ton Bedford scrap yard crane.



STEEL MILL CRANES BEDFORD

BEDFORD FOUNDRY & MACHINE COMPANY, INC. - BEDFORD, INDIANA



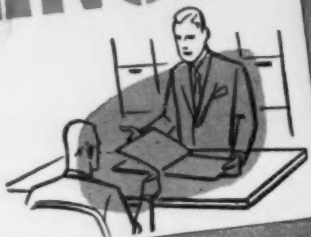
GUIDED MISSILE plant operated by Consolidated-Vultee Aircraft Corp., Pomona, Calif., gets heat and hot water from 19 boilers similar to this unit made by National Radiator Co., Johnstown, Pa. Natural gas is used. If gas transmission is interrupted, a propane-air mixture is used.

Turn Page

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EXPERIENCE

• The range, versatility and flexibility of Standard Conveyor equipment have been developed in more than 45 years of service to business and industry. You can rely on Standard Conveyor for the right type of equipment to best serve your needs.



For Production • Assembly • Packing Lines • Roller and Belt Conveyors



• To keep things moving—on production, assembly, processing or packing lines—mechanize your handling with conveyors. Standard furnishes all types—power and gravity, belt, roller, slat, chain, push-bar, sectional. Write—address Dept. IA-113.

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• Compact, mobile, self-contained powered belt conveyor. Work it like an accordion—make it long or short—slope it up or down. Easily maneuvered in confined areas. Handles commodities up to 150 lbs. Write for Bulletin—address Dept. IA-113.

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• Move packages up or down from floor to floor continuously. Compact, simple to install and maintain. High continuous line load capacity for any floor elevations, belt widths of 8, 12, 14, 18, 24, 30 and 36 inches. Write for Bulletin 63-D, address Dept. IA-113.

Send for Bulletin 63-D describing the above and other Standard Conveyor equipment. Address Dept. IA-113.



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Technical Briefs

SAFETY:

Safety helmet absorbs impact of 15-lb angle lug.

A 15-lb angle lug which fell recently from the top of a blast furnace at United States Steel Corp.'s Duquesne Works hit a workman below. And he lived to tell about it.

The lug struck with such impact on Harold Hohman's safety helmet, 50 ft below, that the helmet shattered. Safety engineers declared he surely would have been killed if he hadn't been wearing the "hard hat," a combination skullguard and welding helmet developed by Mine Safety Appliances Co., Pittsburgh.

Absorbs Impact

The helmet is designed and built to be "self-sacrificing," MSA engineers explained. Its rounded, smooth crown deflects heavy blows when possible and absorbs the impact, shattering if necessary to prevent transmission of the full force to the wearer's head, neck and spine.

As it was, Mr. Hohman went to the hospital for nine stitches to close a scalp wound, but then went home and was soon back on the



HIS HARD HAT was shattered by a 50-ft drop of 15 lb lug, but Harold Hohman lives to vouch that safety hats pay off.

Turn Page

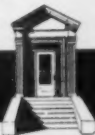
PRECISION CIRCULAR CUTTERS



MEYCO carbide tipped and solid carbide cutters have earned an enviable reputation in plants where long tool life and precision workmanship is a MUST.

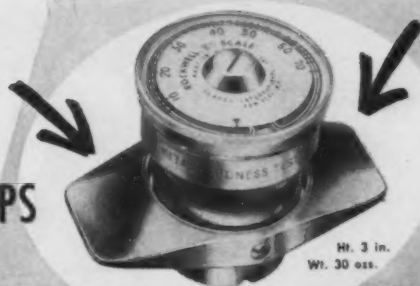
These cutters can be furnished in various diameters and thicknesses to meet the requirements of individual applications.

Saws and cutters, both carbide tipped and solid carbide, will aid production and precision in your slotting, venting, slitting and grooving operations . . . and they will be manufactured to your specifications. Please furnish complete specs and quantities desired when requesting prices and indicate material to be cut. MEYCO experience in the manufacture of precision tools, since 1888, is at your disposal.



W. F. MEYERS CO., INC., BEDFORD, INDIANA

JUST
PRESS
HANDGRIPS
TO



TEST HARDNESS OF ANY SIZE,
SHAPE, TYPE METAL...

DIRECT DIAL READINGS

ACCURACY GUARANTEED BY INDIVIDUAL CALIBRATION

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portable metal hardness testers

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Here's a wealth of gear information condensed into a 20-page, amply illustrated catalog—"EARLE GEARS."

Catalog details include: text material and blueprint dimension drawings of spur, bevel, helical and worm gears; ordering information; helpful formulae; data on non-metallic gears, racks, sheaves, sprockets and special machinery.

You'll want a copy of this complete, concise gear catalog in your files . . . for fingertip reference. Send for a free copy. THE EARLE GEAR & MACHINE CO., 4707 Stenton Avenue, Philadelphia 44, Pa.



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It's good business to do business with EARLE!

THIS BOOK . . . will answer
all your
BRONZE
CASTING
PROBLEMS

. . . and it's

FREE

A 46-page, flat-opening, flexible-bound Reference Book that should be in the hands of every Engineer who specifies or uses Bronze. Due to the cost of preparing and

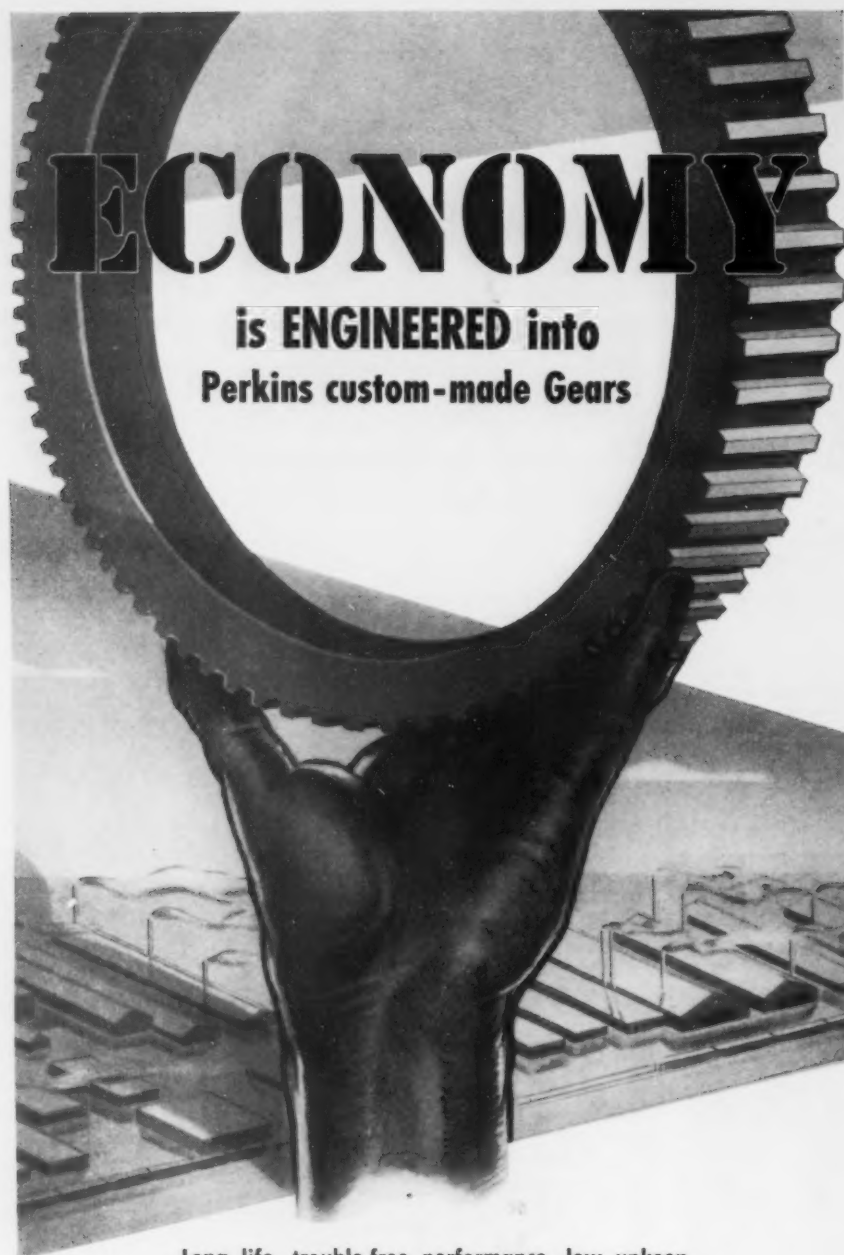


producing this useful book, we can only send it to those who request it in writing on their business letterheads — and remember, there's over 43 years "specialized experience" in casting Bronzes behind us.

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Long life, trouble-free performance, low upkeep record—that is the true measure of gear cost. Using those factors as a means of comparison, PERKINS GEARS cannot be surpassed. As a result, you will find PERKINS PRECISION GEARS in the power transmission systems of the finest products made by industry throughout the United States.

As one of the country's leading gear engineering organizations—solidly backed by a tradition of New England craftsmanship, we are able to produce—to your specifications—any size gear, in any material and in any quantity. Ask us to quote on your requirements.

PERKINS MAKES: helical gears, bevel gears, sprockets, ratchets, worm gears, spiral gears, spur gears with shaved or ground teeth, ground thread worms.

NOTE 1: A new product is the Perkins Precision Spring Coiler. This coiler (patent applied for) turns out precision springs—any type, shape, size, from wire sizes .005 to .125.

2: Another new product—the Perkins "Bendit 15"—a patented metal forming machine bends and shapes sheets, rods, strips tubing into innumerable complex as well as simple forms that would be difficult or impossible to make by other means. Eliminates need for expensive tools or specialized skills. Ht. 47", net wt. 200 lbs. Write today for descriptive catalogs, prices etc.

PERKINS Machine & Gear Co.
WEST SPRINGFIELD, MASSACHUSETTS

—Technical Briefs—

job as a welder for American Bridge Division of USS.

Lug Gets Away

Mr. Hohman had been working on the shell of the blast furnace, off a steel walkway, when the angle lug—8 x 8 x 1/2 in., and 6 in. long, got away from the raising gang working at the top.

The combination skullguard and welding helmet consists of a lightweight, cap-shaped skullguard pressure-molded in one piece from hard, smooth, tough plastic of high fracture resistance. It has a reinforced bead—and a one-piece welding shield.



HERE'S THE LUG and skullguard and welding helmet that took most of the blow on the 50 ft drop of the lug.

TEMPERING:

Addition of water improves salt bath heat treat operations.

A simple method of sharply improving both the quenching and tempering action of salt baths without cost was demonstrated for the first time by American Cyanamid Co. at the National Metals Exhibition in Cleveland. Water was added to a sodium and potassium nitrate-sodium nitrate bath while it was in a molten state.

Operation Improved

The bath will operate at temperatures lower than 275°F, while other baths are limited to 300°F. It also maintains its original composition for long periods of time below the mixture's boiling point.

Martempering and hot-quenching operations take place at greatly accelerated quenching rates.

Turn Page

**FOR IMMEDIATE
DELIVERY**

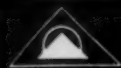
This Late Type
**HEAVY DUTY
39'4" SCHIESS-DE FRIES**
DOUBLE HOUSING
VERTICAL BORING MILL



Movable Cross Rail. Equipped with 2 heads. Arranged for direct DC motor drive including 250 HP-500/550 V., variable speed main drive motor. Two 17 HP tool head traverse motors. 10 HP lubricating pump motor. Max. height under crossrail 10'6". Max. weight of workpiece 200 tons. Net weight with electrical equipment 720 tons. Has been used only 7 years.

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Will Be Sent Upon Request



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PERFORATED METALS

The few perforations illustrated are indicative of the wide variety of our line—we can perforate almost any steel perforation in any kind of metal or material required. Send us your specifications.

Sixty-seven years of manufacturing perforated metals for every conceivable purpose assure satisfaction.

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No. 9-A Self-Dumping
Swivel Wheel Bucket

PENN BUCKETS...

Careful balancing makes Penn Buckets self-dumping when loaded and self-righting when empty. Welded construction prevents "clinging", makes them empty easily and completely. The swivel wheel increases handling efficiency, too.

WRITE TODAY FOR NEW BULLETIN AND DIMENSION SHEET

PENN IRON WORKS, INC.
READING, PENNA.

Degrees of hardening obtained by altering water in bath . . .

Specific degrees of hardening may be obtained by altering the amount of water in the bath, an unusual characteristic since the controlling factor is the bath composition rather than the alloy con-

tent of the steel, it is indicated.

Another important advantage is that the bath can be easily restored to the more conventional type by raising its temperature to eliminate the water. No added costs are involved with this new type bath.

No Splattering

Water can be added without violent splattering if the bath is agitated and below 350° F despite the

bath being more than 100° F above the temperature at which water turns to steam. The nitrate molecules have such an affinity for water molecules that they become bonded before the water reaches the boiling point.

This development represents an unusual exception to a widespread safety practice in the metals industry. Ordinarily water is kept away from molten salt baths. The exception is made possible only by following detailed instructions.

PLANNING:

Model proves aid in expansion of production facilities.

Three-dimensional models of machines and building were used to give a better "preview" of how Kennametal, Inc.'s new Latrobe, Pa., plant expansion would shape up.

New shop building put up by the producer of tungsten and titanium carbide products and specialties measures 96 x 200 ft, half of which contains a second story.

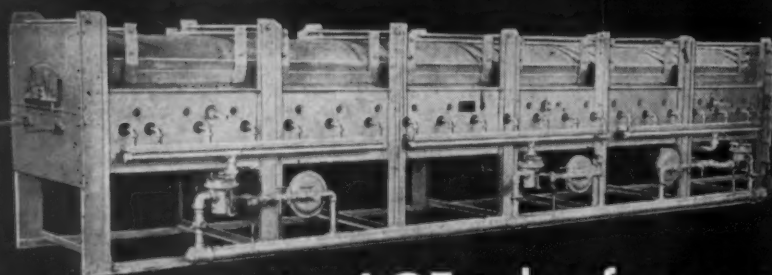
Affording 28,800 sq ft of new production area, the facility will be used to increase manufacturing space with the first floor used to house several departments.

Moving into the new building will be Kennametal's special tool, mechanical development, die making, grinding, inspection, shipping, salvage and stock departments.



SCALE MODEL used to plan equipment layout in Kennametal's new plant addition.

No more "HOT" spots



the AGF tube furnace
model NO. 72

The Reduction of Oxides is very efficiently accomplished in this furnace because of the large number of small burners scientifically positioned to direct a uniform heat along the entire operating length of each tube. This prevents "hot spots" and provides longer tube life.

Other advantages are—

- RIGID ATMOSPHERE CONTROLS
- UNIFORM HEATING OF TUBES
- REMOVABLE ROOF TO FACILITATE ACCESS TO INTERIOR CHAMBER

Specifications—

Chamber length—20 ft., Capacity 6 tubes 2 1/2" I.D.
Entrance is reg. 2" high, max. 4" x 20" wide.
Max. air—85 C.F.M. at 16 oz.
Max. Cons.—(525 B.T.U. Gas)—1000 C.F.H.

For the manufacture of metallic tungsten, molybdenum, etc., long tube furnaces are generally used having one or more tubes through which "boats" are pushed, containing the material to be reduced. Similar types of AGF furnaces are used for the hardening and annealing of steel or brass wire and wire strip.



AMERICAN GAS FURNACE CO.
1004 LAFAYETTE STREET, ELIZABETH 4, N. J.

Write for details and descriptions of AGF TUBE FURNACES.

SULFUR CONTROL:

Instrument measures concentrations of 1 part in 10 million.

An "electronic nose" that can detect and measure the sulfur compounds in gases was described at a recent meeting of the American Chemical Society's 124th national meeting held at Chicago.

The Tritilog, as the device is called, can discern sulfur in concentrations as low as 1 part in 10,000,000, according to Henry Landsberg and Edward E. Escher of the Consolidated Engineering Corp., Pasadena, Calif.

A Growing Problem

The problem of analyzing for sulfur compounds, especially in trace quantities, has always been of great importance in a large number of industries, the speaker said.

This problem is increasing in scope with the continuous strides industry is making in processing materials, many containing sulfur compounds, even trace quantities of which are detrimental to efficient and economic operation.

The emphasis on safety, such as the odorization with certain sulfur compounds of nonodorous natural gas for domestic use, and the monitoring of atmospheres for dangerous concentration of toxic sulfur compounds, has enlarged the problem of analysis.

Less Than 30 Seconds

The instrument which is actually a chemical-electronic instrument and has a sensitivity far greater than that of the human nose, can record within 20 to 30 seconds any changes in sulfur concentrations, Mr. Landsberg stated.

Operation of the instrument is based on a titration—a determination of the smallest concentration of a substance required to produce a given effect in another substance. In this case, the sulfur concentration is titrated with bromine.

The bromine is electrolytically generated in a solution in which the sulfur compounds are absorbed

from the gas. A feed-back amplifying system controls the bromine generating current so that the rate of bromine generation is at all times equivalent to the rate of absorption of the sulfur compounds.

A meter then records the generating current, which is always proportional to the sulfur concentration in the incoming gas stream being tested.

Among the industrial applications of the Tritilog, it was said are the following:

In natural gas—to test the hydrogen sulfide concentration at removal plants, and to control the concentration of sulfur compounds when they are used in natural gas, which is odorless, as a warning agent for gas leakage.

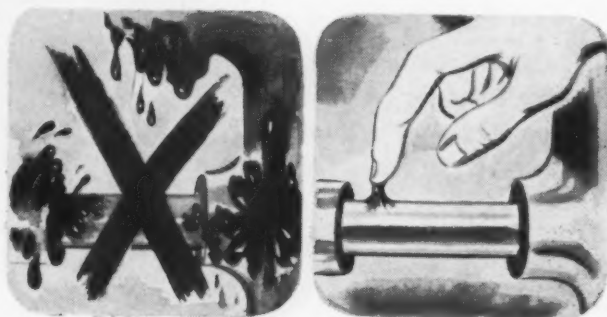
In personnel protection—the instrument may be used to monitor plant atmospheres where sulfur compounds may reach toxic levels.

As a catalyst protector—small tracers of sulfur compounds can be detected.

STOP

SPLASH...
SPLATTER...
DRIP...

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Lubricated Surfaces!



Use the oil that "clings"! Oil less frequently. Insure better lubrication for longer periods.

Write for a liberal test sample of Magnus Kling Oil and prove to yourself that it gives perfect lubrication longer, without drip, splatter or splash!



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PILOT RUNS



**SPECIAL METHODS PRODUCE
SMALL QUANTITIES AT
MINIMUM COST.**

When you need just a few pieces — when you're still in the experimental stage—then an economical, cooperative source of parts is important.

Our **Machine-Cut Method** avoids custom die costs completely by use of special machinery which skillfully fashions pilot quantities.

Careful calculation determines the point at which labor costs warrant our **Short Run Method**, which uses simple contour dies and special purpose presses.

Best of all, when you get into large quantities on the experimental part, our **STAMPINGS DIVISION** is still your most economical producer, using our **Production Method**. Thus all three methods are at your disposal. And impartial choice of method *saves money* for you!

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**STAMPINGS
DIVISION**



3211 Union Street, Glenbrook, Conn.

—Technical Briefs—

MATERIALS:

Wrought iron pipe and gas-fired jets thaw freight movement.

Short lengths of wrought iron pipe are being used in a new car-thawing application designed to thaw coal frozen in open hoppers in cold weather, by Norfolk and Western Railway Co.

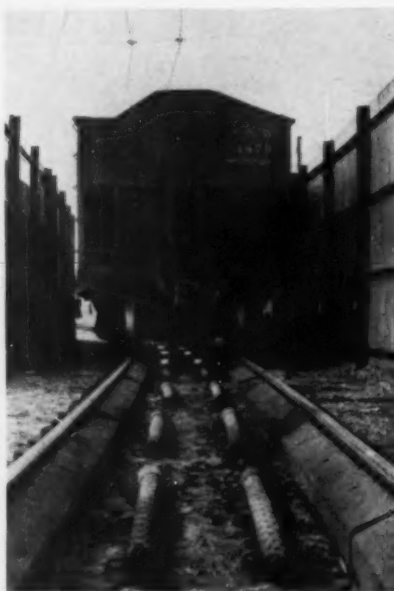
Pilot model of the device, a development of the Railway's engineering department, is installed at the company's coal loading pier at Lambert's Point, Va. It performed satisfactorily in speeding unloading operations when tested for a brief two-week period last winter.

Gas-fired Jets Used

In the car-thawing application, 24 lengths of 4-in. pipe are cut into small pieces and installed near ground level between the rails.



WROUGHT IRON water main gets a welded coupling seal to prevent leakage during installation under New York Central tracks near Cleveland.



NEW THAWING DEVICE uses jet heaters in lengths of 4 in. wrought iron pipe.
Turn Page

**NOW-Make
Your Own
Oxygen and
Nitrogen in
One Generator**

*... and Save
Up to 50%!*



With INDEPENDENT'S newly-designed generators, you can make your own high-purity oxygen and nitrogen from the free air . . . and in the same generator.

You reduce costs up to 50% by eliminating handling costs . . . vaporizing costs . . . evaporation losses . . . residual losses . . . and transportation costs.

INDEPENDENT Generators are available in any capacity, any purity and any pressure. Put your oxygen-nitrogen problem up to us . . . our engineering department will gladly submit recommendations . . . no obligation, of course!

INDEPENDENT ENG. CO., Inc.



O'FALLON 4, ILLINOIS

precision meets production

When precision meets production . . . the result is profits! That conclusion has been proved again and again by Lodge & Shipley Lathes.

Each type of Lodge & Shipley Lathe has many special advantages, some of them exclusive developments. They all have a common purpose, more production, greater accuracy and lower cost. They all have set notable records in American and foreign industry.

Even if your present lathes were "the last word" only a few years ago, you should investigate Lodge & Shipley's contribution to "more production through modernization."

A Lodge & Shipley representative will gladly survey your work. He'll show you, with comprehensive case histories, how Lodge & Shipley Lathes are setting production records on comparable work.

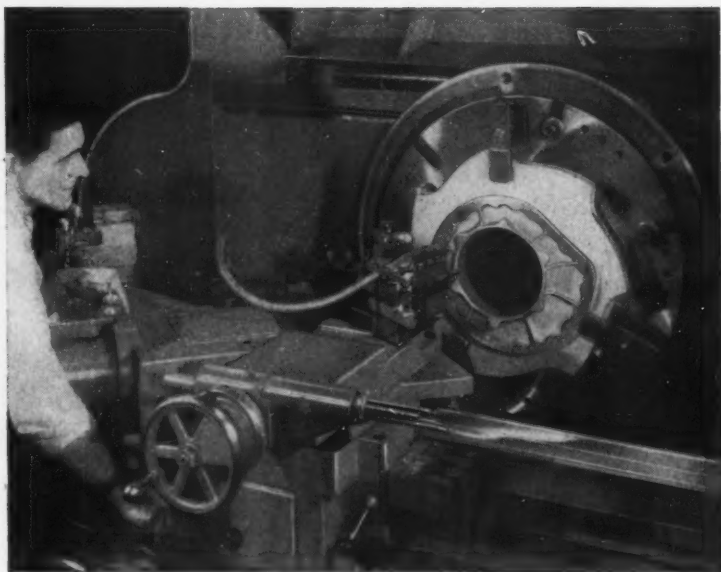
THE LODGE & SHIPLEY CO.
3055 Colerain Avenue, Cincinnati 25, Ohio

Illustration shows the Lodge & Shipley T Lathe machining thin wall, large diameter work-piece at Hotpoint Co.*

*T/M The Lodge & Shipley Co.

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JOHNSON GRAPHITED BEARINGS FOR MANY SPECIAL USES

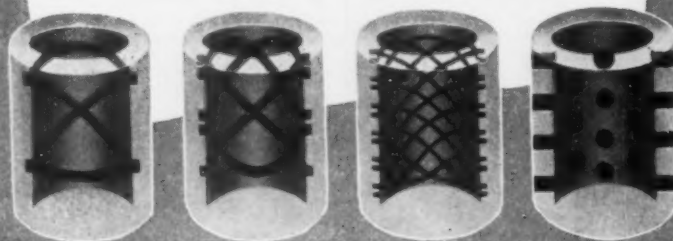
JOHNSON GRAPHITED CAST BRONZE SLEEVE BEARINGS

were developed primarily for applications where lubrication is difficult or likely to be neglected. Another important use is where the shaft speed is too slow or the temperature too low to sustain an oil film; also where high operating temperatures may burn out oils and greases. They are recommended where lubricants might damage goods or foods in process, where dripping oil cannot be tolerated, and in certain underwater applications. Johnson Graphited Bearings are available in three types: with serrated grooves, with graphite plugs, and with graphite-filled oil grooves. The serrated type is a stock item in over 200 sizes, available through Johnson Distributors. Write for full information.

JOHNSON BRONZE COMPANY,
505 South Mill Street, New Castle, Pa.

JOHNSON BEARINGS *Sleeve B Type*

OTHER JOHNSON BEARING TYPES: General Purpose (GP) • Electric Motor (EM) • Self-lubricating Powder Metallurgy • Universal Bronze Bars • Babbitt



SLEEVE BEARING HEADQUARTERS
SINCE 1901

Technical Briefs

Prior to installation, the top half of each pipe is drilled with holes and a gas-fired jet inserted in one end. The compact heating units are then located in double rows at the center of the road bed.

When the device is operating, heat from the jet is projected upward through the perforated area and helps melt the ice formations that otherwise keeps coal frozen in the hopper and prevents prompt and efficient unloading operations.

Resists Corrosion

Norfolk and Western engineers selected wrought iron for the car-thawing application because of the material's proven performance in resisting corrosion and because of its ability to withstand heat at intense temperatures.

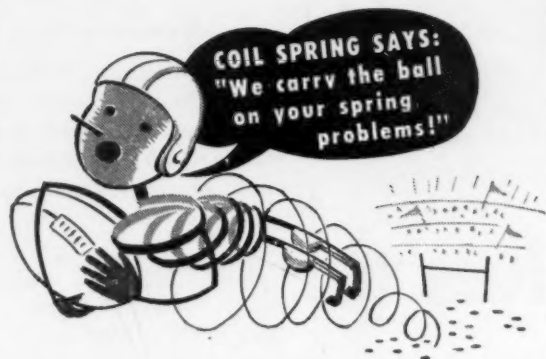
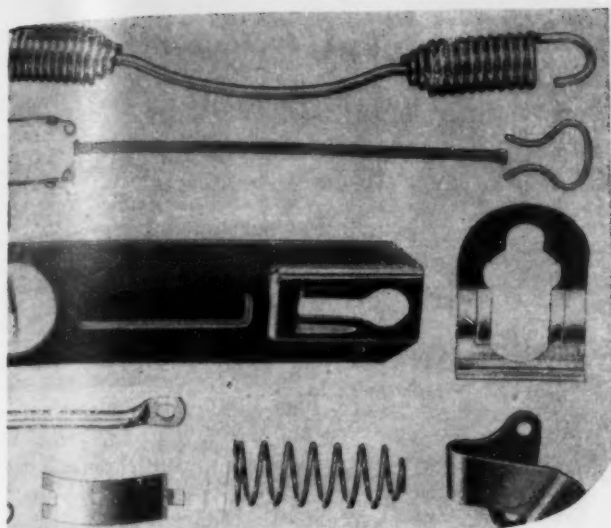
The new technique is one which may be adopted where the combination of snow, ice and cold prevails.

Blast Furnace Nears Completion

Construction of what is claimed to be the largest blast furnace in Europe at the Westfalenhuetter A. G. plant, Dortmund, Germany, is expected to be completed in the record time of 11 months. H. A. Brassert & Co., New York, is constructing the furnace. Revolving distributor fabricated by Dinglerwerke, Zweibrucken, will be used.



LARGEST BLAST FURNACE in Europe nears completion in record time of 11 months as the revolving distributor is installed.



Tough problems are our game. If you're searching for ways to improve your product—either design-wise or quality-wise—you can depend on U. S. for the right answer. For springs, small wire forms and metal stampings, produced economically and to exact specifications, call on us today!

No order too large or too small!

The U. S. STEEL WIRE SPRING Co.

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CLEVELAND 5, OHIO

JIG GRINDING ACCURACY *guaranteed**



**INFINITE CONTROLLED
SPEEDS 30,000 TO
65,000 R. P. M.**

**Easily connect jig grinder
to jig borer or mill**

Then you can finish grind in hardened steel to "tenths" . . . jig grind dowel holes square with a ground base . . . move location of holes in hardened steel blocks . . . jig grind interchangeable holes in hardened sections . . . grind small holes with diamond impregnated mandrels . . . grind contours and relief with tungsten carbide burrs . . . grind radii in die sections . . . eliminate jig bushings in tools where close spacing is essential.

Other infinitely controlled air driven spindle applications

Place spindle on most any machine. Use it for finishing contours on hardened steel working surfaces . . . burring or milling die castings . . . routing wood contours . . . carbide milling or finishing slots . . . finishing holes in hardened steel to "tenths" . . . grinding with diamond wheels, carbide burrs, or diamond impregnated mandrels.

Advantages—10 micro finishes using carbide mills . . . 6 micro finishes using mounted points, operates at any angle . . . air driven, air cooled, overheating prevented . . . speed controlled at optimum point . . . 3 3/4" long motor uses little working space . . . By controlling speed at any point you abolish need for many constant speed spindles.

For immediate quotation please state machine tool application. Get this manual of photos showing operations Vulcanaire performs.

**Dependably accurate to "tenths"*

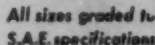


Vulcanaire
It's built by toolmakers for toolmakers

VULCAN TOOL CO.,

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"Certified" Samson Shot and Angular Grit are made *extra-tough* by a special *automatically controlled* hardening process. They wear longer, can be used over and over again . . . actually clean more castings per dollar! Save money . . . switch to "Certified" Abrasives.

Always specify
"Certified"



THE IRON AGE

**"National security
is impossible
without financial security
of individual citizens..."**



FRED MAYTAG
The Maytag Company

"Ingenious research and the ability to produce . . . which have helped to make the United States the world's greatest nation . . . could not have been realized without the savings of millions of thrifty persons. Savings of individuals financed new inventions, developed others. The Payroll Savings Plan for purchasing Savings Bonds regularly provides an easier way for American workers to save for future spending or investment, for their own security, and for their nation's security. Our experience at the Maytag Company has shown us that a successful Payroll Savings program can be the foundation and the cornerstone of happy employee relations."

Let's point up Mr. Maytag's concise summary of the Payroll Savings Plan with a few very recent figures:

- at the close of February, 1953, the *cash value* of Series E Bonds held by *individuals* reached a new high: \$35.5 billion. This is \$1 billion more than the value of the Bonds held on May 1, 1951, when E Bonds began to mature.
- to this encouraging reservoir of future purchasing power, 8,000,000 Payroll Savers are adding \$160,000,000 per month by their consistent investment in U.S. Savings Bonds.
- unit sales of E Bonds in 1952 reached the highest level of the past six years—more than 77 million individual pieces. Of the 77 million units, 67 million were

in the \$25 and \$50 denominations—the bonds bought chiefly by Payroll Savers.

- Payroll Savers are serious savers—of the approximately \$6 billion Series E Bonds which had become due up to the end of March, \$4.5 billion, or 75%, were retained by their owners beyond maturity.

If you are not among the 45,000 companies that make the benefits of the Payroll Savings Plan available to their employees . . . or if you do have a Plan and your employee participation is less than 50%, a telegram or letter to Savings Bond Division, U.S. Treasury Department, Washington Building, Washington, D. C., will bring you all the information and assistance needed to build a *good* Payroll Savings Plan.

The United States Government does not pay for this advertisement. It is donated by this publication in cooperation with the Advertising Council and the Magazine Publishers of America.

The **Iron Age**



cate both set point signal and valve signal.

A large external automatic-manual transfer knob and a set point knob allow easy adjustment and bumpless transfer. Set point indication is the result of a true pneumatic signal tapped from the set point pressure regulator pneumatic line to the controller.

Little Panel Space Needed

The instrument takes 6 x 6 in. of panel space; uses a 4-in. rectangular strip chart available with either electric or pneumatic drive. Unlike many conventional recorders, the Ratographic can continue to function even while pulled forward for examination of internal mechanism.

With its glass door swung open, it easily pulls forward from its chassis and is stopped and supported in an extended position. To completely remove the instrument, a catch beneath the chassis must be released. Pneumatic connections are self-sealing.

WORK SAMPLING:

Simple method based on probabilities aids in work analysis.

Work sampling and other applications of mathematical laws of chance can be used to take the gamble out of production, engineering, and other management problems, Chester L. Brisley, industrial engineer of the Wolverine Tube Div. of Calumet & Hecla, Inc., Detroit, Mich., recently told members of the American Management Assn. meeting at Philadelphia.

Cost Is Less

Work sampling, also known as observation ratios or ratio delay, can be used to produce much the same results as do time studies, at much less cost, according to Mr. Brisley.

Random observations, made in sufficient number to yield an accurate cross-section, will add up to the same figure as would continuous measurements.

Work sampling requires only a fraction of the man-hours required for continuous time studies; can be done by less highly trained observers; and produces "sufficiently accurate" data, according to Mr. Brisley.

Work Simplification Followed

Tried out at Wolverine's Decatur, Ala., plant in 1948, when the plant was new, work sampling enabled engineers to spot quickly the location, relative magnitudes, and causes of the more serious production problems.

A follow-up program of work simplification was developed for the worst cases, and as a result, Mr. Brisley said, methods were improved, productivity was increased, and delays were decreased.

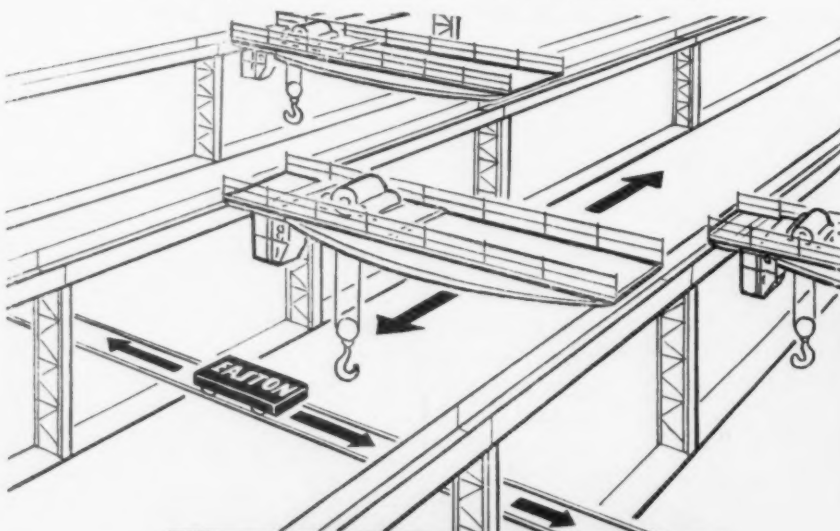
A work sampling study also was made of the way in which professional engineers at Decatur were using their time. As outcomes of the findings, time spent on preventive maintenance inspection was increased, leading to less machine downtime.

Draftsmen were relieved of the clerical work involved in writing engineering orders and requests by being given the use of dictating machines; and the amount of professional-level work done increased by 14 pct.

A similar study was made of the work of the plant's executives to give them factual information they could use in improving the utilization of their time.

Cross-Bay Transfer

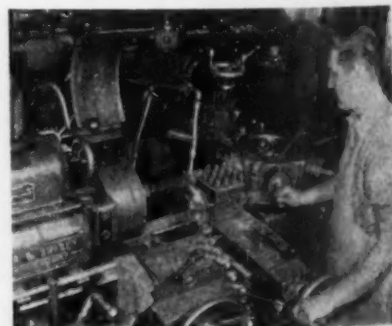
Automatic motor-driven transfer cars provide a universal handling system in modern parallel bay plants now served by overhead cranes. Also for transfer between plant buildings.



EASTON

A-1041

EASTON CAR & CONSTRUCTION COMPANY • EASTON, PA. • NEW YORK • PHILADELPHIA • PITTSBURGH



MACHINE OPERATOR hogs a big $\frac{3}{8}$ in. cut at 0.008 in. feed, 285 sfpm in coolant demonstration at West Point Mfg. Co., Detroit. Cutting speed with new "safety" coolant, made by Dynamic Products, Inc., Danbury, Conn. was stepped-up to 340 sfpm. Tool remained cool and held its edge at high speeds.

Technical Briefs

PRODUCTION:

Inserts used in brake forming dies cut part costs.

An inexpensive insert used on power brake dies allows an average saving of more than \$1 on every part produced, Temco Aircraft Corp., Dallas, claims.

Savings result from elimination of hand-forming that normally follows forming on the power brake machines. Rejections are also reduced by the insert.

Why Inserts Are Used

The insert is made of 1/16 or 1/8-in. scrap steel and designed for use when parts with large holes, cut-outs, or scarfs are being formed. Normally, power brake pressure will cause a part to "flare," if a hole, cut-out, or scarf is located where the bend is made.

"Flare" is an increase in the radius of a bend. It occurs in cut-out or scarfed parts because these areas receive less support from bottom dies.

How They Are Used

The insert lies across the jaws of the bottom die. It is bent to the same radius as the outside of the part that is being formed. The part lies on top of, and is supported by the insert. This support—around cut-out and scarfed edges—equalizes top die pressure along the entire part and allows a uniform bend.

COMPARE these Scarfing Rings used in the tip of a Gas Torch . . .



KENTANIUM Ring
after
1,960 HOURS

SUPER-ALLOY Ring
after
162 HOURS

There's no sign of wear on the Kentanium ring and it's still on the job . . . after 1,960 hours (80 days) of service! Compare this performance with that of the super-alloy ring that had broken down from thermal shock, abrasion, and oxidation after only 162 hours . . . a better than TEN to ONE record in favor of Kentanium. This is a typical example of how industry is effectively using heat-resistant Kentanium.

What's Your HOT Design Problem?

If you need a material having long service life at elevated temperatures, investigate Kentanium . . . an exclusive development by Kennametal. It is a titanium carbide base composition.

Kentanium resists thermal and physical shock, withstands abrasion and oxidation, and retains great strength at 1800°F and above. It weighs only 2/3 as much as steel; is up to 93 RA in hardness.

Many grades of Kentanium are available to meet combinations of specific conditions. A wide variety of simple or complex shapes can be produced, to meet your specifications. Ask our engineers to recommend how you can best apply this remarkable, new heat-resistant material.

An Exclusive Development of **KENAMETAL® Inc.**, Latrobe, Pa.

KENTANIUM

HEAT-RESISTANT, HIGH-STRENGTH, LIGHTWEIGHT
CEMENTED TITANIUM CARBIDE

SALES OFFICES IN PRINCIPAL CITIES

3-45



DIE INSERTS used in brake forming dies at Temco Aircraft Corp., Dallas, cut rejects, save money on parts by reducing extra hand forming.

80 SURFACES IN / CYCLE



The machine is a standard Style 112-C having a heavy well-ribbed base and table, long stroke; handles medium-sized and large work.

EX-CELL-O

C O R P O R A T I O N

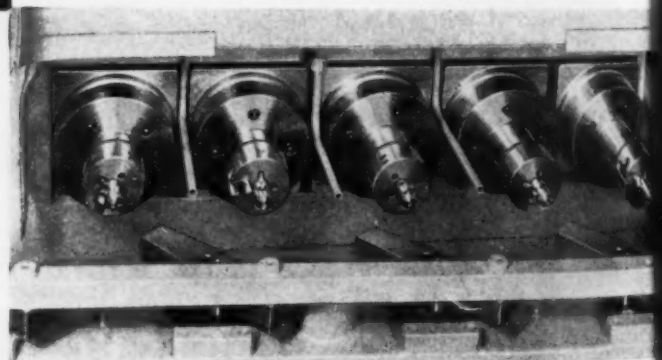
DETROIT 32, MICHIGAN



EX-CELL-O

MACHINE BORES, COUNTERBORES, FACES AND CHAMFERS 20 HOLES

This Ex-Cell-O Precision Boring Machine performs operations on 80 surfaces in one cycle on the projecting holes of a cotton picker bar assembly. Five spindles on the machine bridge are positioned to engage every fourth hole. The fixture indexes automatically between machining strokes to align the next set of holes with the boring bars.



Ex-Cell-O's line of standard Precision Boring Machines is exceptionally complete. Ask your local Ex-Cell-O representative about them, or write to Ex-Cell-O in Detroit for Catalog 31205.

MANUFACTURERS OF PRECISION MACHINE TOOLS • GRINDING SPINDLES
CUTTING TOOLS • RAILROAD PINS AND BUSHINGS • DRILL JIG BUSHINGS
AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMENT

THE IRON AGE SUMMARY...

- Industry passes market tests with flying colors
- Newborn optimists see operations holding well
- "Normal" market factors making full force felt

The steel industry has passed its first real market tests with flying colors. It has hurdled the great transition from sellers' to buyers' market without suffering a sharp decline. The outlook now is that fourth quarter operations will average 90 pct or better. With the possible exception of Christmas holidays, it is doubtful that the ingot rate will slip much below 90 pct of rated capacity.

Better still, the newborn optimists are saying that first quarter of 1954 promises to be fully as good as the current quarter—and perhaps a little better. This expectation is based upon notification by important customers that they will be back in the market for large tonnages in December and the early months of next year.

Partly offsetting these optimistic reports is the fact that steel producers can no longer be assured of comfortable order books with backlogs piled sky high. Steel purchasing agents have tightened buying policy. And mills must keep selling to keep their furnaces going. There is no cushion for adversity.

This is part of the "normal" market everybody knew was coming back. Here are some additional "normal" market factors that have made only brief appearances since World War II:

Seasonal influences are in full force again. Auto industry's late fall decline slowed steel buying; preparation for spring boom will give it a lift. Food industry has been living off inventories; promises to replenish them in the spring. Farm buying also awaits the spring.

Demand for individual steel items varies widely, has become sensitive to changes in consumer goods markets. Cold-rolled sheets, most structurals, light plates, and oil country goods are in fairly tight supply. On the easy list are merchant wire products, tinplate, alloy and chrome-stainless steels. Wire and tinplate are beginning to pick up a little. Also staging a comeback are carbon bars. Mills with flexible finishing facilities have an advantage in this market.

Geography is again playing a stellar role in the steel market. Producers have evolved new freight absorption policies so volatile and so sensitive that market participation can change almost daily. Sales officials must now have up to the minute market information at their fingertips. The new freight absorption policies no longer chart an unwavering course.

Prices are getting more competitive. High cost producers have been forced to shave their premiums. Freight absorption is in some cases lowering net returns to mills. Regular base prices are holding firm. It is doubtful if there will be extensive changes in them until new wage contracts have been signed about the middle of next year. But extra charges might provide a competitive area.

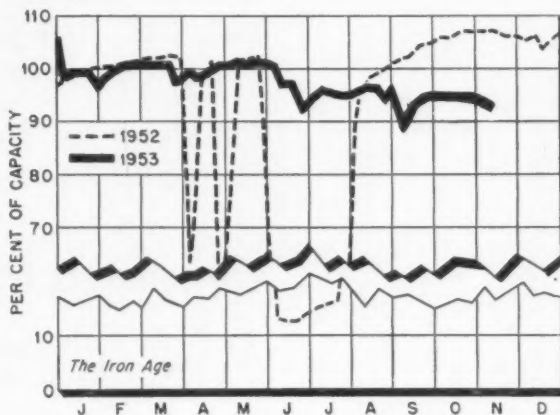
Scrap prices have been giving buyers and sellers the shock treatment. After 10 consecutive weeks of decline they rallied strongly, advancing for consecutive weeks. THE IRON AGE Steel Scrap Composite Price was unchanged this week, the first week it has failed to change in more than 3 months.

Steel Operating Rates

	Week of Nov. 8	Week of Nov. 1		Week of Nov. 8	Week of Nov. 1
Pittsburgh	94.0	92.0*	Detroit	98.0	92.0*
Chicago	97.0	98.5	Birmingham	96.5	96.5
Philadelphia	94.5	95.0	Wheeling	102.0	101.0
Valley	93.0	92.0*	S. Ohio River	81.0	78.5
West	93.0	94.0*	St. Louis	89.0	89.0
Cleveland	92.0	94.0	East	99.0	88.0
Buffalo	106.5	106.5	AGGREGATE	93.0	93.0

Beginning Jan. 1, 1953, operations are based on annual capacity of 117,522,470 net tons.

* Revised





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Markets at a Glance

Big Automakers Will Buy More . . . Steel purchases by Ford, Chrysler and GM in the first quarter are expected to be above first quarter of this year. Independents will purchase slightly less than they did early in '53.

Shop for Oil Pipe . . . Once harried oil purchasing agents are beginning to shop closer to home for tubular goods. Supply should ease even more due to added capacity of Colorado Fuel & Iron and Republic's new mills.

Start Coke Production . . . First batch of coke of an anticipated yearly output of almost a quarter million tons was produced last week from the recently rebuilt ovens of "D Battery" at American Steel & Wire Div.'s Cleveland Coke Works. The 45 ovens in the new battery will produce 625 tons of coke daily.

Place Big Rail Order . . . Pennsylvania Railroad has ordered 100,000 tons of steel rails at a cost of \$8.8 million. The orders which are a third larger than last year's were placed with U. S. Steel, Bethlehem and Inland.

Tungsten Furnaces Lit . . . Army Secretary Robert T. Stevens this week started fires in two new furnaces at the six-furnace tungsten plant of Wah Chang Corp. in Glen Cove, N. Y. Capacity of the plant is classified, but said to be the world's largest. Kuo Ching Li, president of the firm, said the government encouraged the development of the furnaces, but stressed that the plant had been built without government financial aid.

Britain Lifts Nickel Controls . . . Following similar action by the U. S., Britain lifted restrictions on use of nickel, effective Nov. 6.

More Steel from West . . . American Iron and Steel Institute estimates steel production in the West (includes 12 steel companies) will probably be around 6.9 million tons, or 12 pct greater than in 1951, the previous record year. In addition, the West's share of national steel output will be slightly more than ever before.

Expand Iron Powder Facilities . . . A new boost in iron powder production is set for Plastic Metals Div. of National Radiator Co. The firm has purchased a new 80-ft rotary kiln for the reduction of iron oxide to sponge iron. Powder is produced by pulverizing and screening the sponge.

Beat Out U. S. on Locomotive Order . . . Japan, Germany and Austria beat out the U. S., Britain and Canada in bidding for Indian orders for 400 locomotives scheduled for delivery by March, 1956. Loss of these orders is considered to be a fairly serious blow to Britain, formerly the traditional supplier of India's railroad needs.

Get Writeoff Certificates . . . During the 2-week period from Oct. 8 through Oct. 21, Office of Defense Mobilization issued certificates of necessity for 94 new or expanded facilities amounting to \$295,327,877. Among the most important certificates: American Pipe Line Corp., \$144,097,000, with 25 pct allowed on \$137,197,000 and 40 pct allowed on \$6.9 million, for transportation of petroleum products from Beaumont, Tex., to Newark, N. J.; Sharon Steel Corp., Farrell, Pa., metallurgical coke, \$16.5 million, 85 pct allowed.

Steel Kitchen Surge . . . Republic Steel Corp. says production of steel kitchens by its Berger Div. is already seven times greater than output one year ago. Employment is up 20 pct, and officials are considering addition of a third shift.

TV Prospects . . . Fifty million television sets will be in operation within 5 years, estimates TV manufacturer Allen B. DuMont. Cost will make the swing to color television slow, but Mr. DuMont predicts that within a few years color television receivers with 21 in. screens will be selling for around \$500.

Prices At A Glance

(cents per lb unless otherwise noted)

Composite Prices	This Week	Last Month	Year Ago
Finished Steel, base ..	4.634	4.634	4.634
Pig Iron (gross ton) ..	\$56.59	\$56.59	\$56.59
Scrap, No. 1 hvy.			
(gross ton)	\$35.33	\$35.33	\$32.33
Nonferrous Metals			
Aluminum, ingot	21.50	21.50	21.50
Copper, electrolytic ..	29.75	29.75	29.50
Lead, St. Louis	13.30	13.30	13.30
Magnesium, ingot	27.00	27.00	27.00
Nickel, electrolytic ...	63.08	63.08	63.08
Tin, Straits, N. Y. ...	82.00	81.50	80.25
Zinc, E. St. Louis	10.00	10.00	10.00

Slab Zinc Stocks at 7 Year High

High October output pushes stocks up despite gain in shipments . . . Another smelter cuts back . . . Seek higher duty . . . U. S.-Chile copper talks go on and on—By R. L. Hatschek.

October's 84,031-ton slab zinc output, highest in the past year and a half, has pushed up smelter stocks about 17,000 tons. Total shipments for the month were 67,175 tons, about 10,000 tons more than September, and unfilled orders dipped to 25,950 tons. It's a cinch that this production high won't be surpassed for a long while to come.

Still another smelter is cutting production (See THE IRON AGE, Oct. 8, p. 400). This time it's St. Joseph Lead Co. which is trimming 1500 tons a month from its Josephtown plant's production. Reason is obvious: Current smelter stocks of 158,417 tons are the highest total since 1946.

More Tariff Talks . . . Zinc producers last week were outlining their woes before the U. S. Tariff Commission. Nothing is needed, they said, but a higher, stabler price for their product. This, a great many feel, could be insured by hiking the import tariff and possibly by some sort of quota.

Regardless of the outcome of these hearings, pressure will be applied to Congress by the governors of western mining states to provide for increased tariffs and stiffer import restrictions for lead and zinc.

Cause Unemployment . . . Decision on this action was made at the recent convention of governors held at White Sulphur Springs, W. Va. It is the belief of the westerners that ease of imports has caused a glut on the market and contributed largely to increasing mining unemployment.

Position of the U. S. Interior Dept., as expressed to the meeting by Assistant Secretary Felix Wormser, is that it favors an even break for domestic industry and that it will try to bring about a "curb" on the heavy flow of lead and zinc from abroad.

Reject U. S. Offer . . . Latest in unconfirmed reports on the status of U. S.-Chilean copper negotiations is that Chile has broken off the talks, stating that U. S. terms are unacceptable. The Chilean Ambassador, who was reported to have notified the State Dept., denied it. So did State Dept.

What probably did happen is that the latest offer made was turned down and that now more talks will be held to try and find some common ground to stand on. The Ambassador is neither optimistic nor pessimistic on the eventual outcome. Size of the Chilean surplus is now put at approximately 120,000 tons.

Won't Produce Magnesium . . . Some members of the magnesium industry (See p. 123) feel that aluminum producers would be the logical ones to join Dow Chemical Co. as producers of primary magnesium. But it isn't likely.

Aluminum producers feel it would be far more profitable to expend the required energy in advancing aluminum business. At the rate they're going they don't need to pick up magnesium as a hedge. Titanium or some other long-range metal might be a stronger possibility — though no such plans are known.

Eventually, Maybe . . . But remember that the aluminum industry used about 10,000 tons of magnesium as an alloying material in 1952, more this year. If the aluminum industry can grow to the point where it will consume enough magnesium to justify producing it themselves they'll do it.

Such production would probably start in quantities sufficient for aluminum alloying only — but it isn't difficult to conceive market conditions that would result in a surplus.

The big three all have plants on the Gulf Coast. This gives ready access to two of magnesium's major raw materials, sea water and sea shells. And they already have electric generating plants.

Action in Scrap . . . Aluminum remelt ingot, continuing in the rebound, edged higher in some grades this week while ingot maker buying prices held steady. Dealers' buying price for scrap aluminum are quoted sharply higher this week. Prices went up 1¢ to 2¢ per lb with crankcases, miscellaneous castings and old sheet now bringing 10¢ per lb.

Dealers also upped their copper and brass buying prices pretty much across the board with No. 1 copper now worth 23½¢ per lb. Custom smelters and ingot makers lifted prices about ½¢ to 1¢.

NONFERROUS METAL PRICES

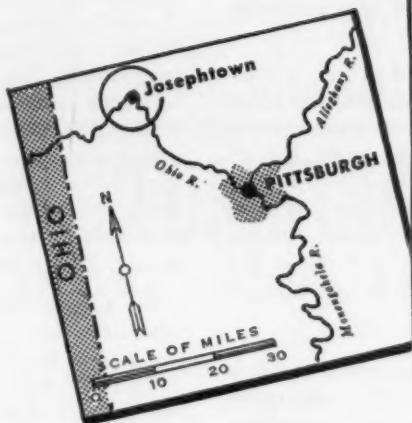
(Cents per lb except as noted)

	Nov. 4	Nov. 5	Nov. 6	Nov. 7	Nov. 9	Nov. 10
Copper, electro, Conn.	29.50-	29.50-	29.50-	29.50-	29.50-	29.50-
	30.00	30.00	30.00	30.00	30.00	30.00
Copper, Lake delivered	30.125	30.125	30.125	30.125	30.125	30.125
Tin, Straits, New York	81.75	82.50	82.00	82.00	82.00*
Zinc, East St. Louis	10.00	10.00	10.00	10.00	10.00	10.00
Lead, St. Louis	13.30	13.30	13.30	13.30	13.30	13.30

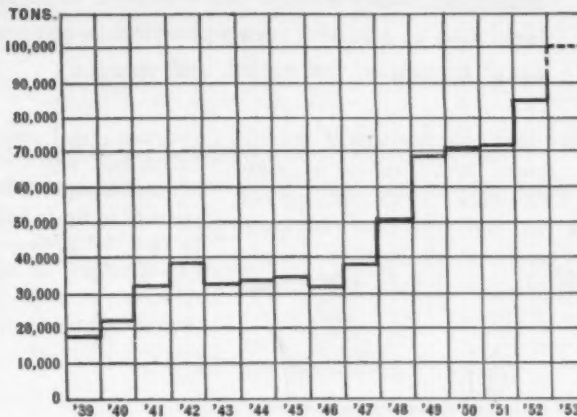
Note: Quotations are going prices

*Tentative

**"For reliability of supply and unquestioned quality —
SPECIFY DOMESTIC ZINC"**



*** SLAB ZINC PRODUCTION
JOSEPH TOWN SMELTER**



U.S. ZINC CONSUMERS... which would you prefer?

A brief study of these curves showing domestic slab zinc production in its relation to imports reveals some facts of interest to every consumer: In periods of greatest necessity, imports of zinc are at their lowest, as for example in 1948 and 1951. Conversely, when there is an abundant supply, imports are at their highest level. As a result, prices decline and domestic zinc production is discouraged—production which may be vitally needed on very short notice. As a matter of fact, the alternate withholding and flooding of the domestic market with foreign zinc has been responsible for some of the wide fluctuations in the domestic price which is so disturbing to the American consumer.

The price concessions offered by importers in easy markets rarely offset the premiums or inconveniences caused by lack of availability of the same metal in tight markets. Furthermore, many grades of imported zinc are not comparable in quality to primary domestic brands produced to A.S.T.M. specifications. In other words, it is not a question of dollars and cents alone.

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BRASS SPECIAL • PRIME WESTERN**

ST. JOE
electrothermic
ZINC

The above recently appeared as a full page ad in a number of national trade publications.

Are Price Gains Here to Stay?

Trade anxiously awaits more orders to firm up recent price increases . . . Dealer scrap plentiful in several areas . . . Mills boost buying of industrial, rail grades . . . Bad dip unlikely.

After their recent uphill march, most prices were marking time early this week, awaiting further orders to continue the advance. Some trade sources were openly fearful that the gains of recent weeks might not be consolidated. Yard scrap is plentiful in most areas as mills strive to sweeten the furnace mix by using industrial and railroad scrap.

But continuing out-of-area shipments in some districts and near-capacity steel operations indicate that there is still a real, if somewhat camouflaged, demand. High mill inventories continue to pain the trade in several areas and may force prices to level off. But there seems to be little reason to expect a drastic dip in the near future. Dealers stress that increased collection and handling costs make maintenance of prices at a reasonable level a necessity.

Pittsburgh—High consumer inventories and emphasis on quality have created a paradoxical situation in the market. Mills are bidding up industrial lists and railroad material as they strive to "sweeten" furnace charges. But dealer scrap is virtually ignored. On basis of the latest list, railroad No. 1 heavy melting moved up \$3.50 per ton this week. Meanwhile, virtually all dealer scrap prices held stationary and, if anything, began developing signs of weakness. With inventories ample and the ingot rate slipping, consumers have adopted an independent attitude toward dealer scrap. They are managing to balance consumption with choice industrial and railroad and are willing to pay a good price to get this material. Blast furnace scrap is off \$1.

Chicago—Consumer activity remained low, but Chicago broker buying prices continued to hold last week. In a few commodities, prices actually showed new strength. No. 2 bundles

buying freshened when an out-of-area mill siphoned off some material from Chicago. There is some expectation of a dip in railroad prices, though a few rail grades are still moving up. Yard scrap is slow in moving into the area even at present prices, though yard reserves of scrap in the metropolitan area are reported fairly high.

Philadelphia—Scrap prices in this district have leveled off pretty much at last week's levels and indications are that they'll remain steady. The upward trend seems pretty well stopped and, while one mill cut its prices for truck-delivered material, there would be little reason in cutting back prices again. Low phos business is at a low ebb and prices are nominally lower.

New York—A strike by yard workers had brought operations to a standstill in most major yards in this area early this week. Virtually nothing was moving in spite of orders placed last week. Earlier activity had strengthened some turnings grades considerably, but the strike itself had at press time had no effect price-wise. Cast appears to be strengthening.

Detroit—This market is hoping for some buying to support the recent price increases. Fear here is that unless some active purchasing materializes prices are in for another plunge. Release of August orders recently boomed automotive lists but business has lapsed to only moderate local movement. The exception has been some brisk buying of turnings prior to the closing of navigation which has edged these prices up somewhat.

Cleveland—Headshaking is vigorous here as both dealers and brokers try to link up talk of firmness with reduced steelmaking operations and total lack of consumption. On the bullish side railroad scrap went up \$2 across the board on the basis of recent list bidding. Railroad cast fol-

lowed the trend edging up from \$46.50 to \$47 delivered. Brokers admit they are after orders and dealer scrap is plentiful. It could presage a leveling off or another price dip.

Birmingham—First of month scrap orders by northern mills were nominal and were being filled reluctantly by southern dealers. A Georgia mill was back in the market, raising prices to the Birmingham level, but the biggest buyer in the district was not buying. Brokers and dealers say that although the price drop seems to have been halted, it dropped lower than it should before brakes were applied.

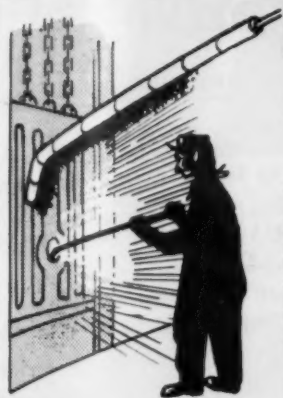
St. Louis—Although bids on railroad lists have been rising, railroads are said to be dissatisfied with prices offered and one road has withheld acceptance of bids for approximately 2100 tons of scrap steel, indicating that prices should be higher in view of what they must pay for finished material. Dealers report that recent advances have had little effect on boosting receipts.

Cincinnati—Expected local buying hasn't materialized. Softness in other scrap centers has begun to hit out-of-area shipments. Some brokers feel price structure will weaken if local consumers continue to stay out of the market. Despite reports of melting inventories mills seem content to go along on small stopgap purchases.

Buffalo—Additional business has been placed by a leading mill buyer within the advanced price ranges established last week. A tighter market has developed even though dealers report good yard receipts. Cupola cast prices rose \$1 on new sales.

Boston—Scrap prices in New England underwent a further readjustment in the past week. No. 2 steel-making grades dipped, while No. 1 busheling rose slightly. Some turnings were stronger except for chemical borings which nosedived some \$4 per gross ton in complete absence of demand.

West Coast—No exports reported yet but some coast dealers feel that without lifting of the restrictions price would have dropped another \$3 per ton this month. No price changes last week but market further softened by temporary shutdown of another furnace in San Francisco area.



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Lock Nut
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—on sheet metal assemblies—components—parts, etc.

Low-cost, one-piece Washer Type PALNUT Lock Nuts do the job of an ordinary nut, lock-washer and plain washer combined. You save parts and handling operations—get speedy, assembly with hand or power drivers. PALNUT double-locking spring action holds tight under vibration. Built-in washer spans holes and slots. Wide range of standard sizes. Send details of assembly for free samples and literature.

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TRADE MARK
LOCK NUTS

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CAP SCREWS • SET SCREWS • MILLED STUDS
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16" x 78" centers PRATT & WHITNEY Toolroom Lathe, taper attachment, collets, chucks, new 1943
 27" x 12' centers LODGE & SHIPLEY Selective Geared Head Lathe, AC-MD
 28" x 15' centers BERTRAM (Niles patterns) Timesaver Engine Lathe, 2 carriages, rapid traverse, AC-MD, 1943
 36" x 12' centers AMERICAN Heavy Duty 16 Speed Geared Head Lathe, AC-MD
 42" x 96" centers NILES Timesaver Heavy Duty Lathe, 42" swing over ways, rapid traverse, anti-friction head, AC-MD
 40" x 20' NILES BEMENT POND Geared Head Engine Lathe, rapid traverse
 No. 5 GISHOLT Ram Type Turret Lathe, preselector head, new 1943
 No. 1L GISHOLT Turret Lathe, preselector head, bar feed, tooling, new 1943
 No. 1A WARNER & SWASEY Universal Turret Lathe, Timken spindle, electric chuck
 No. 2A WARNER & SWASEY Universal Turret Lathe, preselector head, bar feed, chuck, new 1943
 No. 3A WARNER & SWASEY Turret Lathe, Timken spindle, electric chuck, tooling
 33" bar LUCAS Table Type Horizontal Boring Mill, vertical milling attachment, power rapid traverse, AC-MD
 No. 2H KEARNEY & TRECKER Vertical Milling Machine, new 1945
 No. 2 CINCINNATI Vertical Mill, dial type, new 1945
 No. 2 VAN NORMAN Plain Horizontal, new 1943
 No. 3-24 CINCINNATI Plain Hydromatic Mill, AC-MD
 No. 4 KEARNEY & TRECKER Plain Horizontal Mill, No. 50 taper, motor in base, rapid traverse
 No. 4 CINCINNATI High Speed Dial Type Plain Horizontal Mill, new 1943
 No. 4H KEARNEY & TRECKER Vertical Mill, new 1944
 No. 16 BLANCHARD Rotary Surface Grinder, 26" magnetic chuck, AC-MD
 25A HEALD Rotary Surface Grinder, 24" diameter magnetic chuck, AC-MD
 1 1/2" LANDIS Bolt Threader, leadscrews, AC-MD
 75 Ton HENRY & WRIGHT Double Crank Dieing Machine, roll feed & scrap cutter
 600 Ton CHAMBERSBURG Wheel Press, cast steel frame, inclined, AC-MD
 30" MORTON, Hydraulic Keyseater, new 1942
 48" x 48" x 12' NILES Double Housing Planer, 2 rail heads, 1 side head, power rapid traverse
 48" widened to 69" x 12' DETRICK & HARVEY Double Housing Planer, box table, DC reversing motor drive

O'Connell
 MACHINERY CO.
 of BUFFALO, n. y.
 1693 GENESEE ST.

The Clearing House

NEWS OF USED AND REBUILT MACHINERY

Expect Slimmer Profits . . . Used machinery dealers in the Pittsburgh district are generally more hopeful than they have been in recent months. Nevertheless, they are resigned to slimmer profit margins in keeping with the more independent attitude being shown by buyers.

With their main attention now centered on reducing costs, used machinery purchasers are managing to squeeze most of the profit out of deals that used to be quite lucrative as far as the dealer was concerned. Most dealers say they are experiencing more difficulty in closing sales but also report inquiries for used machinery are more plentiful and more diversified than they have been recently.

Had "Dream" Deal . . . In spite of the many discouraging aspects of the used machinery market at present, dealers can still hope for the occasional "dream" transaction such as was put through by a leading Pittsburgh firm recently.

The deal involved sale of a gear plant which a dealer was handling. Before he even had a chance to advertise, a buyer popped up and bought out the plant, including all the equipment.

Some Mills Buying . . . The trade reports business in electrical equipment in the Pittsburgh area has picked up slightly because of increased activity by steel mills which are on the lookout for motors to be used as spares. On the whole, however, the market for electrical equipment is on the soft side.

Coal mines, normally a good outlet for various types of electrical equipment, are virtually out of the market, dealers say.

Want Small Cranes . . . In the used crane business, Pittsburgh used machinery firms say demand is still continuing at fairly high levels for ac equipment in the 10-ton capacity range with spans

from 60 to 75 ft. One dealer says the vast majority of the cranes he has sold recently were of 5 to 10-ton capacity.

There also seems to be some demand for heavier cranes. One inquiry reported in the Pittsburgh area is for a 100-ton crane with an 80 ft span and an auxiliary hoist of 35 to 50-ton capacity.

But the general view is that the increased availability of new cranes has tended to take the edge off sales of used equipment. Delivery on new cranes is now running about 5 to 6 months. When the market was tight, delivery delay on this type of equipment was usually about 12 months.

Prices Dip . . . Used machine tool dealers around Detroit say the current soft tone of the market is pushing prices down. Only a few general purpose tools such as jig borers, jig grinders, Blanchard grinders and Kellering machines can demand premium prices.

Experience of most dealers is that at auctions bidding prices for these tools are too high. As a result most of the tools are going directly to the user.

Tool and die shops in Detroit are still quite active, which means toolroom equipment is still enjoying a good market.

Wait and Watch . . . Machinery movement in Detroit is tied closely to the automotive industry, and the current uncertainty about the automotive market for 1954 is having a bearish effect on machinery purchases. No one knows what the market will be like 2 or 3 months from now and buyers are marking time until the outlook is clearer.

Slight pickup noticed in this area in the last few weeks (THE IRON AGE, Nov. 5, 1953, p. 240) can probably be traced to model changeovers and new model introductions which always stimulate business in Detroit.